THE AMERICAN GAS LIGHT JOURNAL

REDMAN&KENNY,N.Y.

PUBLISHING OFFICE No. 32 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, VENTILATION, WATER SUPPLY AND DISTRIBUTION, & GENERAL SCIENCE.

VOLUME LXV.—No. 7. Whole No. 1,106. | NEW YORK, MONDAY, AUGUST 18, 1896 | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
JOS. R. THOMAS, C.E., Editor. T. J. CUNNINGHAM, Asst. Editor.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 32 Pine Street, New York.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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BRIEFLY TOLD.

PRESIDENT JONES' ADDRESS AT THE FOURTH ANNUAL MEETING OF THE PACIFIC COAST GAS ASSOCIATION.—In this issue of the JOURNAL will be found our first instalment of the proceedings had at the Fourth Annual Meeting of the Pacific Coast Gas Association, and although the giving of the record of the work accomplished in San Francisco on that occasion may seem somewhat belated, the delay was unavoidable. Belated or not, however, the matter that is printed has vitality sufficient to cause it to be interesting, if read even at a very much later date than that of our current issue; for the members of the Coast Association were evidently in earnest over that which they said and did. The President of the Association—Mr. E. C. Jones—who, even if he has been in charge of the works' end of the San Francisco Gas Light Company for quite a term, is nevertheless a born and bred New Englander, delivered a well-thought out and well-prepared address. Amongst the many sensible suggestions it contains, we imagine that his remarks respecting the futility of considering anything connected with the manufacture and distribution of gas as hackneyed or thoroughly threshed, to say nothing of such things being perfectly understood, will be received with acquiescence. To be sure, some one (perhaps two!) engineers may know all about everything, but, on the other hand, are the hundreds and over who, in common with Mr. Jones, for instance, are disturbed anent "naphthaline and its attendant troubles." So we fear the "one, or perhaps two," knowitalls will have to wait for the presentation of a completely unhackneyed subject until they are joined by a stout re-inforcement from the still learning class. Others of his co-laborers will also heartily join him in the hope that out of the present chaos of gas accounts will shortly be evolved a system that, having uniformity for its basis, will help the "learning class" to a better understanding of what each is accomplishing, when it comes to a comparison of what "A" is doing at one place with that which "B" is doing at another. It is also decidedly gratifying to know that Mr. Jones is in practical sympathy with the thought of securing uniformity in gas works castings, which movement attained practical worth in the East when the Society of Gas Lighting formulated its admirable schedules some four years ago. Another portion of the address well calculated to attract and retain the thought of the reader is the chapter devoted to statistics connected with the development of the California oil fields; and we make bold to say that not many unconnected with the oil trade proper were aware that California had assumed such importance as an oil producer. According to Mr. Jones, the output of oil in California during 1895 was no less than 1,550,470 barrels, of which quantity he estimates one-fifth was used in the manufacture of gas. We are inclined to challenge the correctness of this part of his estimate; for even admitting that the oil is not an especially good oil for gas manufacture, in that possibly the gas maker would be obliged to use perhaps 12½ per cent. more of it than if Eastern oils were employed to secure equal candle powers, and keeping in mind the average candle power of the gas supplied on the Coast, it looks to us that a 16 per cent. estimate would pretty nearly include all the California oil taken up in gas manufacture there. It is also worth noting, the difference in price of the oil per barrel, as shown in the price that ruled in May last, when the tankage was somewhere near the point of being up to caring for the surplus from the wells, as against that of September, 1895, when the tankage was all insufficient. Mr. Jones' address is well worth reading, and we congratulate him over its lines and the way in which it was received.

THE HEARING BEFORE ATTORNEY-GENERAL HANCOCK IN THE MATTER OF THE BROOKLYN UNION GAS COMPANY.—Early last week Attorney-General Hancock listened to the arguments presented by lawyer Paul E. De Fere, acting for John C. Lester, on the petition of the latter for permission to institute proceedings against the Brooklyn Union Gas Company, which he declares is illegally founded, in that it is nothing more nor less than a trust, composed of the separate Companies that formerly supplied gas in Brooklyn. Mr. William H. Dykeman, representing the Company, made a good argument in opposition to the plaints of Mr. De Fere, after which the Attorney-General took the case under advisement. Of course, if these proceedings had been brought and were carried on in good faith, the shareholders in the Brooklyn Union Company would have slight cause for complaint; but the real truth is that Mr. John C. Lester, in whose name the case was nominally brought, is one of the projectors of an ill-smelling paper gas con-

cern (the Mutual Gas and Electric Company, or of a title closely approaching it) that has for months vainly attempted to secure recognition from the Brooklyn Board of Aldermen. In fact, we have no doubt that Lester and his associates would speedily eliminate themselves from the Brooklyn gas situation did the proprietors of the Brooklyn Union Company see fit to offer them a "substantial consideration." If that view of the case is a fair one, we will likely be pardoned for suggesting that Lester's case is not on its face meritorious.

NOTES.—Mr. William Capelle, one of the organizers of the Evansville (Ind.) Gas Company, died at his home in that city on the evening of the 7th inst. He was in his 71st year.——It is reported that a concern, to be known as the Kalamazoo Heat, Light and Power Company, has been formed to do business in Kalamazoo, Mich. It is capitalized in $200,000, and its officers are: Directors, H. Manvel, G. W. Miller, A. M. Stearns and E. B. Caldwell; President, George W. Miller; Vice-President, E. B. Caldwell; Secretary, A. M. Stearns; Treasurer, Homer Manvel.——On the 11th inst. Judge Werner issued a judgment of foreclosure and sale to the bondholders of the Canisteo (N. Y.) Electric and Fuel Gas Company on a mortgage of $39,000, and the plant and franchises will shortly be disposed of at public auction.

How to Calculate Seals.

In a paper on "Notes on Back Pressure," read by Mr. J. Ballantine, of Rothesay, at the last meeting of the North British Association of Gas Managers, the author had this to say in respect of how to calculate seals:

* * * This brings out another point in connection with pipes sealed in liquid, as in the hydraulic main, and where a pipe sealed in liquid acts differently to the plates, underneath which gas is often made to pass in washers. With a plate any force slightly superior to the seal of the plate will cause the gas to find its way back beneath it as easily as it can go forward. But when a pipe is sealed by dipping in a liquid its seal cannot be forced under ordinary circumstances. Take, for instance, the dip pipes in the hydraulic main. We will suppose the dip is, say, 30 inches from its lower end to the underside of bend. Then before its seal can be forced it will acquire a pressure above 30 inches, unless there is too little liquid in the vessel to fill the pipes.

To illustrate this let the three-necked Woulff's bottle represent an hydraulic in which there are two dip pipes. We will now allow the pressure from the holder to act on the surface of the liquid, when it will be seen that the liquid immediately rises in the dip pipes to the extent of the back pressure. If the back pressure is 3 inches the liquid rises 3 inches, and if 4 inches the liquid will rise 4 inches, and so on, as long as there is enough liquid to keep up the connection between what is in the vessel and what is in the pipes. With too little liquid or too little seal the liquid in the pipes will become separated from the main body of the liquid, and the gas will pass through with a much smaller excess of back pressure than 30 inches, if the exhauster is not working. With the exhauster in use this will not apply. But suppose there is no exhauster or, if there is, that it is stopped for cleaning and repairs, then we should have our seal arranged in such a way that it can be immediately raised to the necessary level, and no more, to prevent the gas from coming back into the bridge and stand pipes.

The amount of seal required for this is a matter of simple calculation. Dip pipes are generally 5 inches in diameter, which gives an area of 19.635 inches. This, multiplied by the length of the dip in inches from its lower end to the under side of bend (inside), will give the number of cubic inches required to fill it. Multiply this again by the number of dip pipes in the hydraulic, or section of it, and you have the total quantity of cubic inches required for all the dip pipes. Then ascertain the area of the hydraulic inside at water level, and the quantity of liquid displaced to fill the dip pipes is easily ascertained. Suppose the hydraulic main is 20 feet long by 24 inches wide inside at water level, and there are 12 dip pipes in it, each 5 inches diameter by 30 inches from lower end to under side of bend, then—

$$\frac{19.635'' \times 30'' \times 12}{240'' \times 24''} = 1.227.$$

So that 1¼ inch of seal would be ample. If there are 16 dip pipes, then the seal will require to be 1¼ inch, because more liquid will be displaced to fill them. Should the hydraulic vary in width between the water levels, allowance must be made for this when calculating its width. More seal than this will be of no benefit whatever; but will rather be a drawback, by adding extra resistance to the gas passing from the retorts.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.]

FOURTH ANNUAL MEETING, PACIFIC COAST GAS ASSOCIATION.

HELD IN SAN FRANCISCO, CAL., JULY 21 AND 22, 1896.

FIRST DAY—MORNING SESSION.

The Association was called to order at 10:30 A.M., of July 21, by the President, Mr. E. C. Jones, who said: Gentlemen—It gives me great pleasure to meet the members of the Pacific Coast Gas Association this morning, and it seems fitting that the fourth annual meeting should be held in this room. A year from now and this building will be no more. Our fourth meeting savors of a wake over the bones of the old Howard street gas works which were first started here 42 years ago. The first business in order will be the calling of the roll, but I suggest that it be postponed until the afternoon session, as many members will arrive on the morning trains.

On suggestion of Secretary Britton the reading of the minutes of the last session was omitted, as they had been fully published in official organ.

The Vice-President took the Chair, and President Jones read the following

INAUGURAL ADDRESS.

Gentlemen of the Pacific Coast Gas Association: Our fourth annual meeting is an assembling of friends and a brotherhood of men zealously working to increase the prosperity of the gas industry. There is a binding link, a sort of free masonry, between the gas men of the Pacific Coast, which insures success for our meetings by the simple coming together of our members.

In the early days of our business the gas engineer occupied a field unchallenged in the business of artificial lighting, and for decades the economical manufacture of gas suffered in consequence. It was not of first importance how best and how cheapest to produce gas, but how to most easily and comfortably keep the holders full.

The advent of new and competing forms of illumination awakened the dormant resources of the modern gas engineer, and the result is a body of keen-thinking and energetic workers in a cause to which we are all devoted.

Our Association occupies a field which is neither Western nor Eastern, as these terms are usually applied, and includes a territory of 717,310 square miles, equal to one-fifth of the total area of the United States. In this vast area, which includes California, Nevada, Oregon, Washington, Arizona, Utah and New Mexico, there are 66 gas companies, 42 of which are represented on the membership rolls of our Association.

The combined New England States have an area of only 66,192 square miles (which is not so large as the one State of Nevada), and have 136 gas companies, whereas Nevada has but two. Of the 136 gas companies in New England, 78 are represented in the oldest Gas Association in the United States—the New England Association of Gas Engineers, the mother of gas associations. Thus it will be seen that the territory covered by the Pacific Coast Gas Association is nearly 11 times as large as the entire New England States, while there are less than half as many gas companies.

In the immense field of our Association 63.6 per cent. of all the gas companies are represented on our membership rolls, which, with one or two exceptions, is a larger percentage than the representation of companies included in the territory covered by the other eight Associations of the United States.

Our territory is one of magnificent distances, and many of our members are obliged to travel nearly a thousand miles to reach the place of meeting. You must not infer from this that I consider the number of miles travelled a proportionate measure of the zeal and loyalty of our members; yet the fact cannot be ignored that the amount of time and money required to cover these great distances is an evidence of the active interest taken by our members.

On the other hand, our Association may take unto itself the credit of bringing together this number of men who are geographically so widely separated, yet so near to each other in fraternal feelings, good fellowship and common interests. It is my earnest hope that the spirit that prevails among us at these earlier meetings of the Association may continue unchanged.

Our Association is unique in the fact that we all meet on a common footing—every member is an active member, entitled to all the rights and privileges of the Association; and I am of the opinion that any attempt to classify our members, as is customary in other Associations, would be to our disadvantage.

One of the features which makes our meetings most attractive is the mutuality which exists in the discussion of our papers and questions.

No detail of our business is so unimportant that it will not receive the best thought of our members. There are no trifles in the gas business, and as straws may show which way the wind blows, so does the aggregation of little things in the gas man's daily work enable him to successfully combat competition and cheapen the cost of his product.

I have been sorry to hear some of the ablest engineers in our profession speak of some old questions as "hackneyed." Anything that any member does not know, and anything that is of the slightest interest can never become hackneyed.

The particular subject I have in mind is naphthaline and its attendant troubles. Ever since the introduction of clay retorts, and we have ceased to be satisfied with stewing coal, with gas as a by-product, naphthaline has been a trouble which has taxed our resources and menaced our comfort. It has been more written about than any other subject connected with gas making, yet can we call it hackneyed when no good reason for its sudden appearance and disappearance has been found, and no positive preventive has been discovered.

Uniformity in all things relating to the manufacture and distribution of gas is most important to the companies represented in our Association ; uniformity in accounts, books of record and calculation of cost, also in dimensions and weights of castings, and weights and measures in daily use.

A system should be formulated which should be adhered to as far as practicable and permissible by local conditions. At the second annual meeting, held at Sacramento, in 1894, Mr. J. A. Britton read a valuable paper on " Proper Books of Record."

I am sure that the paper was received with deserved approval and that many of its suggestions have been adopted ; but to obtain the greatest and most lasting benefit from a uniform system of accounts for gas companies, there should be complete unanimity in the adoption of a method of bookkeeping arranged to suit the existing conditions of the majority of the gas companies.

The question often arises, " What is the cost of the gas in the holder ? " and in answering this question many misleading statements are made. Statements of cost are made which are accepted by the uninitiated and reflect credit on the skill of one manager, while they disparage the skill of his equally worthy neighbor. When a gas works is producing nothing but gas, and none of its working force is used in distribution, then every item of cost within the gates, including raw material, labor, repairs, depreciation, manufacturing supplies and salaries, should be charged against cost of gas in the holder.

Many statements of cost in the holder include only coal, less residuals sold, retort house labor, purification materials, labor and water used for condensing, scrubbing, etc.

This mere skeleton of cost must of necessity be much lower than a figure which includes everything, and the use of such estimates is a serious injustice to the careful manager who includes every item of cost, regardless of the lack of that exhilaration which attends a good showing, yet with a full knowledge that, at the end of the year, a day of reckoning comes, when the actual cost must include everything connected with gas making. A uniform segregation of accounts in a gas works will enable the manager to keep a check on each detail of the manufacture, and, by comparison from week to week, he is enabled to quickly discover loopholes through which there may be any waste.

No gas works is so small that this may not be profitably applied. The value of uniformity of accounts is well illustrated in Massachusetts, where the manufacture of gas is regulated by a State Commission, and in order to furnish the required yearly statistics it is imperative that the methods employed by each company shall comply with the requirements of the Commission. I trust that I am not overestimating the value of a uniform system of accounts, and I recommend that a committee be appointed to consider the subject and report at our next meeting.

The application of uniformity to castings used in construction and repairs is a saving of expense and trouble, and would prevent many serious errors which might accrue from false measurements. I have prepared a chart of standard dimensions which I think meets the requirements of the Pacific Coast and can be adopted by the manufacturers without needless expense.

These dimensions of castings, if adopted, and their use insisted upon, relieve you of the necessity of making careful drawings and specifications and confine the foundryman to known weights for each piece. I may safely say there is not a casting in the North Beach Station of the San Francisco Gas Light Company which cannot be duplicated by ordering from this chart, and the new casting will fit exactly in the place of the old one. This idea is not original with the Pacific Coast Gas Association, but is an outgrowth from the work accomplished by the Society of Gas Lighting, which appointed a committee on "Uniformity of Gas Works Castings," in November, 1890, which committee made a complete report January 21, 1892, in which report it was declared that eight of the most prominent foundries in the east had agreed to adopt their suggestions. This report has been carefully digested, and its best suggestions have been incorporated in the chart which I have prepared for distribution among our members.

I also recommend the appointment of a committee to consider the subject of standard castings and the adoption of standard weights and measures to govern our Association in the future, the committee to report at this meeting.

During the past few years apparatus for the manufacture of water gas have been introduced in some of the large works auxiliary to the existing coal gas plants, and within the last year or two many of the smaller companies have adopted the manufacture of water gas exclusively. With oil at a reasonable price, and cheap Welsh anthracite coal, it was found that water gas could be manufactured at a much lower cost than coal gas, with the advantage of more rapid production, increased cleanliness, and no trouble from handling or marketing residual products.

It has been found that a water gas plant of sufficient size to produce the total amount of gas required to light the town is a valuable auxiliary to a coal gas works, as it enables the gas manager to avail himself of low prices of bituminous coal, anthracite coal and petroleum, and also to take advantage of high prices, and a good demand, for coke, tar and ammoniacal liquor ; but to economically manufacture water gas it is necessary that there shall be a constant supply of oil at a fair price.

Any interruption in the supply might seriously affect the calculations of a gas manager in arranging for his season's work, and any unevenness in price will keep him constantly calculating the cost of his gas, as compared with coal gas, at existing prices of raw material, and in every city or town where water gas is manufactured there should be a well defined line, on one side of which water gas may be made, while on the other coal gas must be made.

In the eastern part of the United States, until recently, naphthas have been used for the manufacture of water gas. These oils were almost entirely devoted to this purpose, and a 63° B. naphtha was supplied at a reasonable price. Naphtha, however, became scarce and expensive, and the gas companies were forced to use a distillate, known as gas oil, at a much higher price.

The scarcity of oil and the increase in price have caused many eastern gas companies to either partially or wholly discontinue the manufacture of water gas, and go back to making coal gas under improved methods. This has stimulated the bituminous coal business in the east, and increased the business of manufacturers of articles used in making coal gas.

In California the discovery of petroleum in Los Angeles, and the prospecting for oil at many places along the Coast with varying success, caused the gas engineers of the Coast to look for extremely low prices of oil and a bountiful supply. The production of oil in the State of California is sufficient to manufacture all the water gas needed for all purposes for which gas is used in the State, and, in fact, for the district covered by our Pacific Coast Gas Association; but the locations of the wells which produce this oil are such, and the distance to points where the oil could be used is so great, that the question of freight makes the use of oil prohibitive at certain points. The entire production of petroleum in the State of California, for the year 1895, was as follows :

Santa Clara county, Moody Gulch, 1,460 barrels of 42° B. oil having a paraffine base ; San Fernando, or Pico district, 182,560 barrels 38½° B. ; Puente, 128,050 barrels of oil, varying from 19° to 33°—the old original wells in this field yielding an oil of 19° B.; Ventura county, 242,400 barrels, averaging 24° B.; and within six weeks some wells on Sespi creek, at Four Forks, have yielded an oil of 33° B., and arrangements are being made for storage facilities ; Santa Barbara county, Summerland, 16,000 barrels, of a minimum of 12.2° and a maximum of 13.7° B.; the Los Angeles oil field yielded, in 1895, according to the Oil Exchange records, 980,000 barrels.

The total production of petroleum for the State of California, exclusive of a few wells which yield very small quantities of oil, was 1,550,470 barrels.

In producing this large quantity of oil, it is easily seen that a market must be at once provided for it, as the tankage of the Coast is comparatively small, and as the amount used in the manufacture of gas

would not exceed one-fifth of the total production, the other four-fifths sought a market in other directions. Some of this oil is refined, and the illuminating oils, naphthas and lubricants find a ready market, while more of it is sold for fuel purposes under contracts covering terms of years at stated prices. This contract system ties up the surplus oil, so that at the present moment it is extremely difficult to obtain a supply of oil of given quantity and quality for gas making purposes.

All of the oil produced at Pico passes through the refinery, and most of the oil produced by the Union Oil Company is refined at Oleum, Cal., producing a naphtha of 58° B., illuminating and lubricating oils, asphalt (which is used for roofing and varnish making), and a 28° distillate, which is sold for gas making purposes.

During the year 1895 all of the oil from the Puente district was used by the Chino beet sugar refinery, and was conveyed to them through a pipe line 18 miles long. At the present time a refinery is in operation at Chino, and the products of the refinery are sold in the Los Angeles market, the sugar factory using the residual oils.

The finding of oil at Los Angeles and the rapid development of the small and contracted oil field present to us a most unique situation. The oil was discovered in the heart of a residence district of the city, where the building lots are all 25 by 100 feet, under different ownership. If a prospector did not put down a well in each corner of one of these lots, his neighbor would immediately avail himself of the advantage of putting down a well near his property line and thus drain as much of the oil underlying his neighbor's lot as possible.

Owing to the contracted nature of this field, and the fact that the field has been carefully defined on the north, south and west sides, with an extension of possibly 60 or 70 feet practically defining the field on the east side, the result has been the sinking of 330 wells, up to February 1, 1896, and between that and the present writing 45 more wells have been drilled. The close proximity of these wells precludes the possibility of very large individual output. The wells of the Pacific Coast Oil Company not being within 300 feet of each other, the Los Angeles field has nearly 20 wells in the same area occupied by one well in any other oil field.

The Los Angeles oil wells seem to be constantly lessening in production of oil, and this has led to an attempt at deepening the existing wells. So far this has not succeeded in increasing the product, but has opened veins of salt water, which, if not kept out by plugging, will destroy the wells. A list of prices obtained for the oil at the wells in Los Angeles may be interesting to you, showing the fluctuation in prices from January 1, 1895, to the present time:

January 1, 1895, the price of oil at the wells was $1.00; February and March of the same year it dropped to 70 cents; in April and May prices ruled from 65 to 55 cents; during June, 50 cents; July, 40 cents; August, 35 cents; and in September the lowest recorded sale which can be verified was 29 cents per barrel, although it has been stated that private sales were made at as low as 25 cents per barrel at the wells.

The reason of this decline in prices was due to the constantly increasing output, with practically no storage facilities, and as outlets for the oil were arranged for and tanks were constructed, the price of oil began to stiffen in October, 1895, at which time it reached 40 cents.

The Standard Oil Company constructed 75,000 barrels of tank storage, and the Union Oil Company, of California, built tanks of 45,000 barrels capacity. This served to care for some of the surplus oil from the field.

From October, 1895, to January, 1896, the price fluctuated between 40 cents and 55 cents.

On January 27, 1896, the oil was sold at 55 cents at the wells; January 30, 58 cents; February 8, 60 cents; February 20, 65 cents; March 5, 70 cents; March 25, 80 cents; April 8, 85 cents; May 8, $1.00; May 21, $1.15; May 25, $1.25, at which price the oil is maintained. Eight cents per barrel must be added to these prices to place the oil f. o. b. cars at railroad points.

At $1.25 per barrel the oil in Los Angeles is a cheap fuel and will compete with low price coal. The comparison between oil and coal is made on the basis that 3½ barrels of Los Angeles oil is equivalent in work to one ton of coal. While the oil at this price may be used economically as against other fuels in Los Angeles, the condition of freight to any of the points outside of Los Angeles, where large quantities of oil might be consumed, would raise the cost laid down to a point where it could not be used in competition with coal at present prices.

The present daily production of oil in Los Angeles is stated at 2,500 barrels, but conservative estimates place the amount 500 barrels less, or 2,000 barrels per day.

During the year some prospecting has been done in the neighborhood of San Francisco, and the seepage oil which was obtained is of excellent quality, but on account of not being able to find the pools of this seepage by any prospect holes the field was abandoned. Prospecting is now going on at Spanishtown, or Half-Moon Bay, and Lobetus Creek, in San Mateo County. At Tunitas Creek there are three wells which yield about three barrels per day each, and others are being drilled. At present all the oil taken from one well is used to produce power to drive another. The Union Oil Company, of California, is also drilling wells on its property adjoining the Puente oil field.

Recently oil has been found at Coalinga, in Fresno County, and wells have been drilled which promise a large output of oil of excellent quality. This field is comparatively new, as in 1895 no oil was produced, and, during the early months of 1896, the yield was only from 15 to 18 barrels per day.

During the year 1895 the steamer "Bawnmore" brought two cargoes of Peruvian petroleum from the port of Paita to San Francisco, making a total importation of petroleum for the year 37,200 barrels. This oil was of high gravity with a paraffine base and well adapted to water gas making. It was expected that the importation of Peruvian oil would continue, but the steamer "Bawnmore," on a return trip from Portland, Oregon, ran ashore and was destroyed. At the present time there is no oil carrying steamer bringing foreign oils into California.

On January 6, 1896, the Pacific Coast Oil Company placed in commission the steel tank steamer "George Loomis," with a carrying capacity of 6,400 barrels of oil. This vessel is a model oil steamer in every respect and is used to distribute oil at different points along the coast.

Soon after the installation of the first electric railroads, it was discovered that the return, or "tramp," current made use of gas and water pipes as a conductor for electricity back to its source at the power house. Where the current enters the pipe no corrosive effect takes place, but at the point where the current leaves the pipe the iron is rapidly oxidized and the pipe soon destroyed.

Two years ago this subject, then nearly new, engaged the attention of every large gas and water company in this country. Elaborate examinations of system of mains and services were made to determine the amount of current carried by the pipes. Sensitive voltmeters were used to ascertain the potential of the current.

Danger districts were carefully mapped out, voluminous reports were prepared, and a literary feast of gas men lacked one of its most savory dishes, if it were without a paper on "Electrolysis."

Many interesting specimens of honey-combed pipe have been unearthed, showing the tireless destruction that is going on among our mains and services, yet who hears anything about electrolysis to-day? The scientific papers do not publish articles on the subject, and it is no longer the favorite topic for papers read in our gas conventions, yet the unseen corrosive action is silently eating up our gas distributing systems.

The remedy recommended by most electrical experts is the bonding of the rails which are the property of the street railway company to the mains of the gas company, by means of copper wires sufficiently large and frequently applied to convert the gas mains into a safe and sure carrier of the return current.

The remedy is certainly simple, but involves considerable expense, yet I think the exigency of the case is such that neither labor nor expense should cause delay in the application of a positive remedy.

Why is it, then, that so few gas companies have taken any steps to stop the destruction of their property? It seems to me it is because of the peculiar relationship that exists between the rail and the gas main. A subtle question of equity and priority of occupation of the street also enters into it. Who should pay for the application of this remedy—the railroad company or the gas company? Should the gas company turn over its iron pipes as a free conductor of return currents, when, by bonding them to the rails, it so much facilitates the return of the current that it is noticeable even in the coal pit of the railroad company?

I fear that these mooted questions have caused the peace-loving gas man, like Micawber, to wait until something "turns up;" and in this case it surely will turn up.

If the life of a modern gas man is burdened with troubles, his troubles are more than compensated for by the pleasures of living in this age of discovery. To live to-day in the world of science is a rare privilege, and the pleasure afforded to the thinking mind by each new discovery is more than recompense for the hard struggles of the investigator.

One of the most notable and valuable discoveries of recent years is the manufacture of calcium carbide. By this discovery a vista of possibilities in synthetic chemistry has been opened to the chemist. Few discoveries of our time have been freighted with the promise of so much good to mankind, yet up to the present time no good has been accomplished. Is it possible that the protection granted to inventors by our patent office is sometimes an evil?

The wonderful discovery by Roentgen of the X ray has created world-wide interest, and has already been applied to practical uses; yet the best that has been accomplished by the discovery of calcium carbide has been to provide the children of engravers of stock certificates with shoes and stockings.

In a paper on "Acetylene Gas," read by Mr. T. A. Ferguson at the last meeting of the National Electric Light Association, held in New York, he gives a fair and conservative estimate of the cost of acetylene gas, including all items of expense, and estimating the cost of electrical energy at $20 per electrical horse power per year, which is the actual price charged at Niagara Falls. Calculating the cost of lime, coke, electrical power, carbons, labor, superintendence, packages for shipment, interest on investment, depreciation, taxes, insurance and transportation charged to seaport cities on the Atlantic Coast, he estimates the actual cost of calcium carbide to be $37.69 per ton. With a yield of 5.24 cubic feet of acetylene gas per pound of calcium carbide, and a candle power ten times greater than that of commercial water gas, the cost of acetylene gas in the holders would be about 37 cents per 1,000 cubic feet of 24 candle power gas. The paper concludes by saying that, in the light of present knowledge, acetylene gas should not drive the incandescent and arc lamps from the lighting field.

The hand of death has dealt gently with us during the year in point of numbers taken from us, but the ones selected were from among our best.

Mr. Joseph G. Eastland was a pioneer in the gas business of the Pacific Coast, and was identified with the most important gas undertakings of our State. His death removes from our number one whose place cannot be filled. Our Association has lost a friend who believed in its objects, and by his presence at our last meeting, signified his desire to promote its welfare.

Mr. J. B. Lacy was unknown to most of us, and had never affiliated, by attendance, with the Association, but as a man is judged by the esteem of his neighbors, the report from his home justifies us in expressing our sorrow at his death.

The future of the gas business looks bright in promise of prosperity. We are not wedded to any kind of gas, or to any method of producing it, and by our untiring efforts to extend our business by introducing new gas consuming devices and cheapen the cost of production by the adoption of the latest improvements in making it, we shall mould the future of the gas business. The future of our business lies in the hands of the gas engineer—he is its custodian; and on his studious thought and earnest work the measure of its brightness depends.

Committee on President's Address.

The reading of the President's address was received with loud applause, and, on motion of Mr. T. R. Parker, of Napa, duly seconded, it was ordered that a committee be appointed to consider the President's address, and that a vote of thanks be tendered Mr. Jones.

Mr. Eichbaum, the Vice-President, appointed as such committee Messrs. John L. Howard, T. R. Parker and M. C. Osborne.

The Vice-President—This address, which has been prepared by our President, is full of information, and it is a matter of surprise to me that he has been able to gather so many items of interest. I only hope that in the future we shall be able to have something similar to it every year. (Applause.)

The Secretary then read the report of the Board of Directors, as follows:

Report of the Board of Directors.

To the President and Members of the Pacific Coast Gas Association—Gentlemen: Your Board of Directors, in accordance with the requirements of the by-laws, herewith submit for your consideration the following recommendations, and report:

First. We report that we have examined the books of the Secretary and Treasurer and found them correct in every respect, and the amount of cash on hand is as therein stated, $253.99. Proper vouchers for all disbursements were presented and have been examined and approved.

Upon the application of Messrs. G. W. Jackson, Superintendent of the Capital Gas Company; C. R. Collins, General Manager of the Seattle Gas and Electric Light Company; Geo. C. Holberton, of the Oakland Gas Light and Heat Company; E. E. Ewing, of the Welsbach Commercial Company; A. N. Campbell, representing Keystone Meter Company; H. R. Joslyn, of the Woodlands Gas and Electric Heating Company, and Geo. J. Cowan, beg to report favorably and recommend their election as active members.

We also recommend the acceptance of the resignations of the following, viz.: W. F. Boardman, unattached; J. C. Pierson, formerly of the Capital Gas Company; and we report that we have examined all the papers to be read before the Association which have been submitted to us, and see nothing in them but what should properly come before you for your consideration.

We report that we have appointed San Francisco as the next meeting place, and 10 A.M., of the third Tuesday and Wednesday of July, as the time of said meeting. Respectfully submitted,

S. B. Cushing,
O. M. Gregory,
G. W. Wilson,
F. H. Eichbaum,
C. O. G. Miller,
} Directors.

Committee on Obituaries.

The Chair announced the following as a Committee on Obituaries: Messrs. S. B. Cushing, H. E. Adams and John A. Britton.

On motion of Mr. Crockett, duly seconded, it was ordered that the report of the Board of Directors be accepted and placed on file.

Election of New Members.

Mr. John L. Howard then moved that the Secretary cast the ballot of the Association for the new members recommended by the Board of Directors, which motion was duly seconded and carried unanimously.

The Secretary then cast the ballot for the members so recommended, and the President declared them duly elected members of the Association.

Some Communications.

Under the head of "Communications," the Secretary read letters of regret from W. A. Wood, First Assistant Engineer Boston Gas Light Company; W. H. Bradley, Chief Engineer Consolidated Gas Company, New York; W. H. Pearson, General Manager Toronto Gas Company; C. F. Prichard, Secretary New England Association of Gas Engineers; W. A. Stedman, Brooklyn, L. I.; E. C. Brown, Editor "Progressive Age;" Donald McDonald, President Kentucky Heating Company; Frederick Egner, Norfolk, Va.; E. G. Cowdery, Milwaukee Gas Company; A. C. Humphreys, Gas Engineer; M. S. Greenough, President Cleveland Gas Light and Coke Company; A. B. Slater, Treasurer Providence (R. I.) Gas Company; A. Hickenlooper, Cincinnati Gas Light and Coke Company; Walton Clark, U. G. I. Company, Philadelphia; Jas. W. Dunbar, Secretary Western Gas Association, New Albany, Ind.; Prof. E. G. Love, New York; A. E. Boardman, C. E., Brevard, N. C.; Geo. T. Thompson, New York; Emerson McMillin, New York; Prof. Chandler, New York; Robert F. Fitz, Flume House, New Hampshire.

Also a communication from E. C. Brown, asking appointment of committee to assist in gas exhibition to be given in New York in 1897.

Election of Officers.

Mr. Gregory—I move the suspension of the rules, and that the election of officers be postponed until 2 o'clock Wednesday.

Mr Crockett—I think we had first better finish the routine business and then proceed with the reading of papers and the discussion.

Mr. Steinmann—There was no second to the motion to postpone the election. It has been customary for the President to appoint a Committee on Nominations, but I would suggest that this year the nomination of officers be made from the floor.

Mr. Crockett—I think that suggestion a good one. In appointing a Committee as heretofore, a President could perpetuate anybody in office that he desired to. I think there should be a little more rivalry in this matter, and that every man should be more ambitious to be elected President of this Association. Good rivalry is good for the Association, and I think every gentleman here should feel that he has the right to come up for office.

The President—The manner of nominating officers is not provided for in our Constitution and By-Laws.

Mr. Wharton—I heartily approve of what Mr. Crockett said as to the advisability of electing officers directly from the floor.

Mr. Eichbaum then moved that the Association proceed to the election of officers for the ensuing year, and that the nominations be made from the floor; which motion was duly seconded and carried. The President then announced that nominations for the office of President were then in order.

Mr. Gregory then placed Mr. F. H. Eichbaum in nomination. Mr.

Eichbaum declined the nomination, as did Mr. Charles F. Adams, of Portland, Ore., who was nominated by Mr. Crockett.

Mr. Osborn, of Santa Cruz, then placed in nomination the name of Mr. T. R. Parker, of Napa, the head of the "Wrinkle Department," stating that he needed no eulogium at his hands. The nomination of Mr. Parker was then duly seconded, and a motion made and seconded that the nominations close was duly carried. Mr. Crockett then moved that the Secretary be instructed to cast the ballot of the Association for Mr. T. R. Parker, of Napa, as President for the ensuing year; which motion was duly seconded and carried, and the Secretary cast the ballot for Mr. Parker as directed. Mr. Parker thanked the Association for the honor conferred upon him.

The President then declared that nominations for Vice-President for the ensuing year were in order, and Mr. Clements, of Red Bluff, placed in nomination the name of Mr. F. H. Eichbaum, of San Francisco. Mr. Crockett duly seconded the nomination, and Mr. Steinmann moved that the nominations close, which motion was duly seconded and carried. The Secretary was then instructed to cast the ballot for Mr. Eichbaum for Vice-President, which being done, the President announced Mr. Eichbaum elected Vice-President for the ensuing year.

Nominations for the office of Secretary and Treasurer now being in order, Mr. Steinmann placed in nomination the name of the present incumbent, Mr. John A. Britton. The nominations were closed, and, on motion of Mr. Crockett, the President was authorized to cast the ballot for Mr. Britton as Secretary and Treasurer.

The President—Gentlemen, it gives me pleasure to cast the ballot for Mr. John A. Britton as Secretary and Treasurer of this Association for the ensuing year. I know of no other Association in this country that has so zealous a worker for its Secretary and Treasurer as is Mr. Britton. He has done good work for this Association. (Applause.)

Nominations for Directors for the ensuing year being then in order, Mr. Crockett placed in nomination the names of Messrs. John Clements, of Red Bluff; R. M. Powers, of San Diego; L. P. St. Clair, of Bakersfield, and M. C. Osborn, of Santa Cruz. Nominations were then declared closed, and the Secretary was ordered to cast the ballot for the gentlemen named. After he had so cast the ballot, the President declared the gentlemen named duly elected Directors for the ensuing year.

Report of the Secretary and Treasurer.

The Secretary and Treasurer then read his annual report, as follows:

To the Board of Directors of the Pacific Coast Gas Association:

Gentlemen—In accordance with the requirements of the Constitution of this Association, I herewith submit report for the year ending July 20, 1896.

Number of members enrolled July 16, 1895	74
Added to membership July 16, 1895	16
Total	90
Deceased during year—	
Jos. G. Eastland and J. B. Lacy	2
Net enrollment to date	88

The following applications for membership have been received: G. W. Jackson, Superintendent Capital Gas Company; C. R. Collins, General Manager Seattle Gas and Electric Light Company; Geo. C. Holberton, Oakland Gas, Light and Heat Company; E. E. Ewing, Welsbach Commercial Company; Geo. J. Cowan and A. N. Campbell, unattached, and H. R. Joslyn, General Manager Woodland Gas, Electric Light and Power Company.

The following resignations are on file: W. F. Boardman, unattached; J. C. Pierson, formerly of Capital Gas Company.

Cash on hand, July 16, 1895		$284.55
Collections—		
Dues	$370.00	
Initiation	70.00	
19 emblems sold	37.50	
		477.50
		$762.05
Disbursements, as per vouchers 17 to 36		508.06
Balance cash on hand		$253.99
Number of badges purchased		20
Accounted for as sold		19
On hand		1

Cash on hand	$253.99
Uncollected dues	175.00
Uncollected initiation fees	10.00
Uncollected badges	5.00
Dues for current year	395.00
Available cash	$838.99
Probable expenses of present session	450.00
Balance if all dues are paid	$388.99

Respectfully submitted, JOHN A. BRITTON,
Secretary and Treasurer.

On motion of Mr. Crockett, the report of the Secretary and Treasurer was received and placed on file.

Reading the Papers.

The President, who announced that the next business was the reading of the papers, introduced Mr. John L. Howard, of San Francisco, Cal., who read the following paper on

THE ECONOMICAL USES OF COAL.

Mr. President—By way of preamble, I want to appeal from the mild and irresistible tyranny exercised by the Secretary of this Association. His constitutional powers can be tolerated, but he claims the right to mandamus the lay members to prepare papers for these annual occasions, and, at the same time, he denies them the right of demurrer.

It was substantially a mandatory invitation from him that brings me before you to-day, and he issued it because he happened to know that I had made a hurried trip to the Welsh anthracite coal fields, and because I have been experimenting, in a commercial way, with a new application of an old principle to create artificial draught and thus promote the combustion of anthracite coal

If, therefore, I can "add a pebble to the cairn" of good which results from these periodical conventions, my short paper will have been justified in its preparation.

The manufacturing and commercial classes of this world are developing into a race that is studying costs of production. Genius and talents are constantly employed to reach means for lowering the cost of products, either to extend markets or to increase profits. The changing conditions of business, the keenness of competition, the introduction of new methods and processes are stimulating this study. To use that expressive California phrase, "the fall of '49 and spring of '50" methods, will no longer successfully serve the purposes of business. An excess of cost per unit of product will, if saved, often constitute, on the total output, a respectable profit.

Speaking generally, the members of this Association are in the position of defending their investments and established business. At the moment the invader is electricity, at some points by harnessing the power of water running down hill, and at other places generated at steam power plants.

Some of you have been gifted with foresight and made a virtue of necessity by protecting your gas business with electrical plant investments. Others of you fear, or are confronted with, possible loss of revenue and of dividends during a long struggle with this phenomenally strong commercial infant, and consolidation of interests is resorted to as the only alternative.

New methods and economy seem to constitute the present cry, and as the raw material becomes involved in the problem, I shall confine my remarks to the character and the cost of coal.

Those of you who make coal gas get your supply from the New Castle district, in Australia, and those engaged in making water gas draw from the Swansea district in Wales.

From your coal you expect to get the largest return for one dollar of cost. The intelligent merchant should know which of the legion of grades will best serve your purposes.

First—As to Welsh anthracite. I might here inject that since this paper was prepared there has appeared the first public notification of the direct conversion of the heat of coal into electricity. Those of you who may be interested in reading the results of the first experiments which were conducted under the auspices of Prof. Jacks, the electrician of the Bell Telephone Company, of Boston—which results are vouched for by two of their scientific men—will find them in the *Engineering Magazine* for last July, wherein it is stated that, whereas the efficiency of coal, as developed through the triple expansion engine, reaches only 19 per cent. out of the theoretical value of the fuel, in this experiment they are said to have obtained 85 per cent., I think, of dynamic heat in the carbon.

In my previous paper I explained how the cargo price of coal im-

ported into San Francisco increased and diminished inversely as the outward freight rates on wheat. The cost of coals at point of shipment is not subject to sudden or wide fluctuations, but the varying rates of freight on coal cargoes cause differences, often large, in the delivery cost and in the selling prices.

There is a surplusage of vessel tonnage in the world, and the owners are in constant touch with the world's market, keeping advised of the most profitable employment for ships. Given the prospect of a large volume of wheat for export from California, or the expectation or assurance of remunerative freights on grain, and vessels will immediately seek our ports; under contrary conditions, the reverse is the rule. When favoring conditions attract a bountiful supply of ships, coal constitutes the chief cargo business hitherward. The owner of each ship knows the total cost per ton involved in her voyage, with coal inward and wheat outward. That total cost and his profit must come out of the sum of these two rates. If a total of 40 shillings per ton is necessary to cover cost and profit, and he can secure 27 shillings homeward on wheat, then, in order to secure the vessel, the coal must contribute 13 shillings as freight. Thus the cost of foreign coal landed here is affected by this seesawing adjustment between coal and wheat freights. This explanation will lead to a better understanding of the peculiar condition that existed here in 1895.

The spring months of that year found outward freights on wheat ranging from 25 to 27 shillings, and inward coal freights at 15 shillings per ton. A little later a sudden demand for tonnage was created by the sale of a large quantity of locally stored wheat.

The competition for ships advanced grain freights to 35 shillings, and vessels offered freely. Shipowners competed with each other and forced coal freights downward to 11 shillings per ton. Importers of coal offered inducements to buyers and "sold short" at low rates. When buying ceased they chartered ships and loaded them on speculation.

Welsh anthracite coal was the favorite with them. The Swansea docks were filled with vessels awaiting Frisco cargoes, and the shipments to our ports went, from 86,000 tons in 1894, to 150,000 tons in 1895. The day of reckoning came later. Within short intervals the fleet arrived, and as the cargoes had to be discharged within prescribed limits of time, storage capacity was overtaxed and the market became congested. Vessels were held in the bay for their full limit of lay days. Relief was sought in hiring extra storage yards and in lowering the prices to stimulate the demand.

The spasm passed, wheat freights dropped and coal freights rebounded to 15 shillings; thus, within nine months, the cost of coal varied to the extent of $1 per ton, and due entirely to changes in freights.

The business of last year brought its lessons. This abnormal demand stimulated the production of Welsh anthracite coal, and importers felt that they had good reason for complaint, because many cargoes bore evidence of neglect in screening, some contained too large a percentage of impurities, and much inferior and unknown coal was shipped under the names of reputable brands.

It is found that, as a rule, the mines in that field have no facilities for storing their surplus product and most of them have a small daily producing capacity. The output must go directly into railroad cars; when these are filled and there is no vessel to relieve them, the mine must stop.

In the acceptance of orders for the loading of ships, mine owners are limited in the number of days for furnishing cargoes. Demurrage threatens if they fail. Should their own product be insufficient, nothing is more natural than that they should seek assistance by borrowing or purchasing from a neighbor, who at the time might be praying for relief. It is found that there are nearly as many grades of anthracite in Wales as in Pennsylvania. Differences are both physical and chemical.

Different veins are worked in different localities, and the same vein varies in different parts of the field. In some parts the conversion to the anthracite condition seems to have been more complete than in others. The coals vary in the percentage of carbon contained in them. In many the percentage of sulphur is uncomfortably abundant. In others there are seams of foreign matter, almost impossible of complete removal, and which, if not cast away at the mine, cause trouble by fusing during combustion.

The product of some veins is liable to spontaneous ignition. Some coals are unsuited to gas making, being friable and with a strong tendency to disintegration on exposure to heat.

It is folly to state or to believe that all Welsh anthracite coals are alike in quality, or that the term "Big Vein," which was originally used to designate a grade, has any valuable meaning. The best grades or "Big Vein" coal find a market in Europe at prices which make export to California prohibitory. The lesson to be learned from this part of my paper is that each for himself should determine the brand of coal that will give him the best results for a dollar of cost; and, as a rule, that dollar should be invested when wheat freights are high.

We come now to consider the question of bituminous gas coals. These are produced in the country round about the town and harbor of New Castle, Australia. Those of you who have long been buyers of this article will remember that the corporation mining the Wallsend coal were the pioneers at pushing the Australian coal into this market, and the brand became known and popular, both for gas and steam purposes, under the name of Wallsend Sydney, although the word Sydney has no proper connection with the other term.

So popular was the coal that, in the year 1885, my statistical tables show that its shipments represented 85 per cent. of all the New Castle coal exported to San Francisco.

In the development of the mineral resources of that field other mines were opened, and as a surplus was created by the combined product relief was sought by seeking foreign markets, including our own. Some of these coals are essentially for steam use, being non-profitable in gas manufacture; others, Wallsend included, are desirable for both gas and steam making. There was a singular, I do not say studied, use of the word "Wallsend" to trade upon the popularity of the term, but we were receiving, at one period, Young and Old Wallsend, South and West Wallsend, and some other changes were rung upon the name, and, being shipped here as Wallsend, that fact afforded a pretext for its sale here as such, although buyers sometimes did not get the particular kind of Wallsend that was expected.

These and other coals less costly were pushed forward to such an extent that, in 1895, the original Wallsend coal shipments constituted only 39 per cent. of New Castle coal exported to California—a decline in ten years of 46 per cent. in the position of that coal.

I mention this to illustrate the rapidity with which trade changes, and which can be fully appreciated only by comparison between points of time.

Here, as in the case of anthracite, knowledge is economy; that coal should be bought whose yield in candle feet and in volume and quality of coke and by-products is greatest for one dollar of cost, and there is a fitting period for the investment of that dollar.

In my last paper it was stated we found it impossible to burn Welsh anthracite coal under boilers without artificial draught, excepting where, in a few isolated cases, the height of chimney provided natural draught of strength sufficient for proper combustion. This false draught was created by the installation of an engine, fan, blower and pipes for conducting the air into the ashpits, where a pressure varying from 3-8ths to 3-4ths of an inch was maintained.

Notwithstanding the fact that the recent low cost of importation, the high evaporative power, the absence of smoke and soot, and the low percentage of ashes made Welsh anthracite the most economical and desirable steam fuel offered in this market, its general introduction was checked by the cost of the installation of forced draught; and this was especially true at small plants.

This led to our seeking some other device, and finally, after much experiment, to the use of steam superheated in the furnace, and blown through a peculiar nozzle into a short pipe located in the ashpit door, or through the sides of ashpits. Our experience with this at various places has developed the following advantages over the fan method:

It is more simple, less expensive, and more easily attached to any boiler than the fan blower apparatus.

With the fan, dry cold air is admitted into the ashpit.

With the jet, the air is raised in temperature and saturated with superheated steam. Many grades of coal are found to fuse and melt upon the grate bars, and the slag or clinker adheres to the hot surface of the iron, making the cleaning of fires laborious and difficult, and often destroying the bars.

The saturated air is found to have a softening effect upon the clinker, and the bars are as rapidly and as readily cleaned as when burning soft coal, an effect not produced even when water is carried in the ashpits using fan draught.

Lastly, it is found that the evaporative power of the coal is increased from 3 to 5 per cent. by the use of air heated and saturated by steam from a jet, as compared with dry cold air from a fan. This is not assumed or theoretical, but has been determined in actual practice.

This gain would seem to be due to the fact, that with cold air the result is a short, yellow flame, and beyond the flame limit hot gases are in contact with the heating surface of the boiler; whereas, with

the steam jet, a flame of 20 feet or more in length can be made, owing perhaps to the burning of free hydrogen gas in the furnace, and the difference in the result is most likely due to the fact that, on account of the length of this flame, the heat is carried further back and more evenly distributed over the heating surface of the boiler.

It will thus be seen that this simple apparatus, costing but little, does the work of the more expensive and more troublesome blowing plant, and it does the work better.

I may also add that the consumption of steam by the jet is no more than that required by a fan engine, and, further, that by the attachment of a damper regulator to a novel but simple valve in the steam pipe, the pressure of steam in the boiler can be automatically controlled within a pound or two on either side of a given point.

This application of a very old principle makes no claim of originality, nor is the motive in describing it in any sense an advertisement of the device, which can be constructed by any ingenious or reflective person. We have thought out the means of using a steam jet and, in so far as we have observed and experimented, we think it the more commendable.

Like the legitimate practitioner in medicine, having found a valuable remedy, instead of keeping the combination a secret we give it to the profession for such use and value as it may have. (Applause.)

Discussion.

The President—Gentlemen, you have listened to a very interesting paper, by one who knew what he was talking about. The other day I had the privilege of seeing a double-decked boiler, fired with anthracite coal, on which one of these steam jets or injectors was being used, and it seemed to be working well. It struck me as being almost a little water gas works in itself. I trust that this paper will receive the discussion that is its due.

Mr. Eichbaum—In corroboration of what Mr. Howard says, in reference to the increasing length of flame, I would call the attention of the gentlemen accustomed to making coal gas to the fact that when a bench is working under ordinary circumstances, and no agitation takes place from the bars, there would be no flames issuing from the short stacks that are generally used in coal gas works. No doubt you have noticed that the jar and the shaking of the bars, to get the ashes out, the ashes dropping into the water in pan, cause a flame four or five feet long to come out where there was none before, which is exactly in accordance with Mr. Howard's statement that there is a generation of hydrogen gas which goes up through the fire and increases the length of the flame.

Mr. Britton—I feel that this is a question of great importance, at least to most of us. Nearly all of us are associated with electric light enterprises, where the cost of fuel in the boilers is as much a consideration as is the economical administration of our gas works. In common with Mr. Jones I have seen the device that Mr. Howard alludes to, and its effectiveness astonished me very much when I first saw it. The flame ran back from the fire box to the combustion chamber, producing a hydrogen gas most powerful in its effects, and those who know anything about the use of coal will readily see the advantage obtained by pulling or pushing the flame back so as to get an even amount of heat all over the surface of a boiler. Of course the blower process does that to a certain extent, but not economically. We have a forced draught which is quite expensive as compared with the steam jet. I have not had the opportunity of trying this device spoken of by Mr. Howard, but I know of other places where it is being tried and with wonderful effect. As he says, it is free as air to us all, and if that one thing alone constituted the only feature of this morning I feel we have been repaid with big interest for meeting here.

Mr. Parker—In corroboration of the remarks made, I will state I had the pleasure of visiting the Napa Woollen Mills yesterday and seeing the device in operation there. It is very simple. Mr. Holden, who is giving a report on it, thinks that he saves at least 7 per cent. over the coal he had been using, and possibly even better than that. He is not ready to make a written report, but he gives just what he thinks is the result of the experiment. He is very much in favor of it. He also speaks of it with relation to the use of Welsh anthracite, from which he says he gets more bulk than from the other coal. Mr. Clements, who was also present with me, probably noticed some things that I have not mentioned.

Mr. Clements—I had the pleasure of visiting the Napa Woolen Mills with Mr. Parker, and I felt that their arrangement there was an excellent contrivance. From the report of the proprietor of the mills I am satisfied that he was more than pleased, and I was satisfied that it was doing very good work; and through the suggestion of Mr. Howard, as it can be done without money and without price, so far as my knowledge goes, I would recommend it.

Mr. Britton—I think it might interest some of the members if Mr. Howard would describe the construction of this injector of his.

Mr. Howard—I am sorry I did not bring one of the nozzles with me. The attachment simply means tapping the steam boiler in any part, conducting the pipe through the furnace in such a way that it shall not be liable to be burned out, but shall get the advantage of whatever heat there may be in the furnace for the attenuation of the steam. The pipe is then continued, either to terminate through an orifice on either side of the boiler walls, or carried to the front, about the upper half of the ashpit door. The superheated steam is then allowed to pass, regulated by a little hand valve, and when the attendant or fireman thinks he has sufficient air he stops the valve at that point. The operation simply means that the inflowing current of steam draws in and behind it and mixes with it a certain quantity of air, depending on the velocity of the steam current. That mixture of saturated and heated air then passes up through the grate bars, and my friend Jones has helped me out with the balance of the chemical theory involved in the process. He thinks that this vapor, which those who are familiar with chemical symbols represented by H_2O, leaves the oxygen and takes up with the carbon gases that are being set free under the heat, that freeing of the carbonic oxide can be detected by the color and character of the flame (blue and purple, and short in length) just above the bed of coal; the hydrogen gas being left free burns as such, and gives the long yellow flame. The difference between the flame made by cold air, fanned, and that made by the steam jet, is as I have described. With cold air the yellow flame is short in length, and you are dependent for the generation of steam by the passage of the hot gases through the tubes to escape up the stack. In this case, however, it is the yellow flame itself which comes in contact with the heating surface of the boiler; and we have found that, using cold air one day and saturated air the next day, there was a difference of from three to five per cent. in favor of the steam jet. That is the whole process. Had I known that I would be called upon to explain the process I would have brought the jet with me. I would be glad to give any information that any one desires. I know perfectly well it is practically of more value to steam users than to gas men generally, although I knew it would have a value to those who would be obliged to generate steam under the boilers; and if it has a value you are entirely welcome to it.

Mr. Powers—This is the first time I have had the pleasure of attending the meetings of the Association, and I confess that I now feel amply repaid in having listened to the paper read by Mr. Howard. I used Welsh anthracite coal for some time and with great difficulty. I suppose he must have a different kind of coal from different veins, as is described, but we have been obliged to resort to many means in our endeavors to obtain good results. We have used coke and oil, but I knew something was lacking. From the commendation with which the paper was received I feel we have ascertained what it is we are seeking. If we can get anthracite coal at reasonable figures, those of us who are operating electrical plants in conjunction with gas works may have some prospect of definite figures to base their calculations upon in this event.

The President—The first part of Mr. Howard's paper has not yet been touched upon, and I hope the discussion will not end here. I am sure the members would like to hear from Mr. Crockett on that portion of the paper.

Mr. Crockett—I think Mr. Howard very well expressed that. We all knew here that anthracite coals have come to us in a very mixed conditition. We all know there is no one vein in Wales that supplies a whole cargo of coal, and any one who thinks that he is getting one special line of coal soon finds that he is not; it is mixed coal. One point in the paper—that Welsh anthracite coal will catch fire from spontaneous combustion—I have never known about.

Mr. Howard—Mr. Adams, who has a case in hand now, can testify to the fact. Last fall I had a cargo on the ship "Clan Gowan." She put in at Port Stanley, in the Falkland Islands, on the other side the Atlantic. While crossing the Atlantic she got afire, and they had to scuttle the vessel in order to save her. Mr. Adams has a cargo in the bark "Columbo," which is now at Rio. Its cargo took fire crossing the Atlantic, and the recommendation, as announced by the cable, is that the cargo be sold at once in Rio.

Mr. Crockett—Did that record contain the amount of carbon under the government test?

Mr. Howard—I could not tell that. Some of the coal from some of the veins is liable to spontaneous combustion; but there is no known

theory for it, although it is a well known fact, which I discovered on my visit to Wales, that some of the shippers are afraid of long voyages for their coals. I am sorry to say that a lot of that coal has been surreptitiously mixed in with reputably known coals.

Mr. Crockett—I had never known of any case of anthracite coal taking fire that came to us, until after my return from a protracted absence last year, when I learned that they had.

Mr. Howard—I have heard of half a dozen of them.

Mr. Britton—I would like to ask Mr. Howard as to whether or not the Welsh coal has been introduced into the eastern part of this country for gas purposes.

Mr. Howard—Some little of it goes into New Orleans and Galveston, but not the North Atlantic.

Mr. Britton—Is it possible for interested companies here to make arrangements by which a responsible agent could be maintained in Wales, looking to the protection of the purchasers of coal here?

Mr. Howard—I suppose that could be done as I have arranged for. It depends entirely on the selection of the mines from which that coal is shipped.

Mr. Britton—Can that be guaranteed?

Mr. Howard—Yes, sir.

The President—In connection with the paper, I will read a note on an article, which I read the other day, that might be of interest to you, the results of which show almost perfect combustion of coal.

"*Uses of Coal.*—An important advance has been made during the year in the economical burning of coal, by the invention of an apparatus by Herr Wegener for burning finely pulverized coal in such a way that the quantity of coal consumed and air admitted for combustion is effectually regulated. This apparatus is in use on the Continent, and is now being used in the works of Messrs. Bryan, Donkin & Co. This is an important stride in the use of coals, as, by the use of this invention, there is no waste of the raw material, and any form of fixed carbon, such as coal dust, slack or culm, coke screenings and breeze, becomes more valuable than lump coal, as it is already well on the way toward being pulverized. Mr. Donkin made a test, in March last, on a Cornish boiler in Berlin, with ordinary grate, and hand stoking, and a few days after, with the same boiler and conditions, using the same coal, but with Wegener's system of powdered or molecular firing, with most interesting results. These results may be found in full in the *Scientific American Supplement*, of July 4, 1896. The thermal efficiency of the boiler was 77 per cent. as against 54 per cent. with ordinary coal firing. The total duration of smoke in minutes observed from the stack is 6 as against 105 with ordinary firing. The combustion of the coal as determined by mean analysis of furnace gases taken every quarter hour is as follows:

"CO_2, per cent. by volume, 8.73 without—15.35 with.
O, per cent. by volume, 8.13 without— 3.14 with.
CO, per cent. by volume, 0.88 without— 0.0 with."

Mr. Howard—I would just remark that this is a very well known method for consuming coal. The Pennsylvania anthracite fields are afflicted with immense mountains of debris, what is known there as culm. Two methods have been tried, one by burning the stuff entire through powdering it and feeding it into a furnace—that is, burning the finely powdered coal in suspension in the air, and the other is by the conglomerate means, converting it into bricks, such as you have seen imported from the Continent of Europe. There is no doubt in the world that finely powdered coal, if it can be distributed properly in the furnace, will yield the very highest efficiency; but the difficulty is that either the seller or consumer of the coal would have to have a pulverizing apparatus, which would be a very serious drawback. There is no doubt, however, but that coal blown into a furnace and properly mixed with air will yield a higher efficiency than the same coal burned in any other shape.

Mr. Eichbaum—Mr. Jones has an item of that.

Mr. Jones—As I remember, it increases the cost 10 per cent., and the efficiency was increased as 77 is to 54.

On motion of Mr. Crockett, duly seconded, the thanks of the Association were unanimously tendered to Mr. Howard for his paper; and upon motion, duly seconded, the Association took a recess until 2 o'clock, P.M.

First Day—Afternoon Session.

The Association was called to order at 2 o'clock by President Jones. The roll was then called, showing the following members present:

ROLL CALL.

Adams, H. E.	Ewing, E. E.	Lally, H. T.
Adams, C. F.	Fenner, R.	Llewelling, H. J.
Allen, C. R.	Fogg, L. F.	Miller, C. O. G.
Burrows, C. E.	Froelich, C.	Meyer, Ph.
Britton, J. A.	Goodman, H. P.	McNeil, J.
Campbell, A. N.	Greer, R. P.	Osborne, M. C.
Carrigan, A.	Gregory, O. M.	Parker, T. R.
Collins, D. J.	Gillespie, W.W.	Petch, T. D.
Cowan, G. J.	Grimwood, J. B.	Powers, R. M.
Crockett, J. B.	Holberton, G. C.	Steinmann, B. U.
Converse, C. M.	Howard, J. L.	Sherman, E. F.
Clements, J.	Jackson, G. W.	St. Clair, L. P.
Cressey, F. A.	Jones, E. C.	Taylor, G. H.
Cushing, S. B.	Joslyn, H. R.	Thompson, G.
Cline, W. B.	Kaneen, J. C.	Thompson, T.
DuVal, W. M.	Knight, D. E.	Vanderwhite, A. J.
Dunbar, W.	Knight, B. A.	Wilson, G. W.
Eichbaum, F. H.	Keaton, G.	Wharton, W. S.

Report of Committee on Obituaries.

The Committee on Obituaries then made the following report:

To the President and Members of the Pacific Coast Gas Association—Gentlemen: Your Committee on Obituaries beg leave to submit the following, with the recommendation that a separate page, to be known as the "Memorial Page," be set apart upon the minutes of this gathering, in memory of Joseph G. Eastland and J. B. Lacy, and that the report herewith be spread thereon.

S. B. Cushing,
H. E. Adams,
John A. Britton, } Committee.

In Memoriam.

Joseph G. Eastland.

Once more the hand of death, with icy fingers cold, has silenced the voice of one of our number.

Let our records bear testimony to our sadness. He was wise in council, just in action, quick to perceive and quick to execute, loyal to his trusts and responsibilities, and stood at the head and front of all great enterprises material to the advancement of the State, which he honored by his life.

His connection with the gas industry dated from its commencement in California, and by his association was it ennobled.

His acute mind, his exceptional reasoning powers, his active intelligence and his dominant integrity will ever be missed in the fraternity of gas men.

Yet but a little time and we will, like him, be called to "join the innumerable caravan that moves through the silent chambers of the halls of death;" then let us heed his last words to us, but a year ago, when he said;

"Let your light so shine before men
That they may see your good works,"

and like him leave a memory revered, a name unsullied and a character for emulation; for no better epitaph can a man desire than that.

In Memoriam.

J. B. Lacy.

Whereas, It has pleased Almighty God, in the dispensation of His wisdom, to call from his sphere of usefulness our associate, J. B. Lacy;

Resolved, That as a mark of our esteem and regret we inscribe upon the records of our Association our appreciation of him as a man, and, in common with the community in which he resided at the time of his death, desire to bear witness to his honor, his integrity and his worth. He was a public spirited man, and full of enterprise for the good of the city in which he lived and those with whom he was associated.

On motion of Mr. Crockett, duly seconded, the report of the Committee on Obituaries was accepted.

A Telegram.

The Secretary then read the following telegram:

New York, July 21, 1896.

E. C. Jones, President Pacific Coast Gas Association, San Francisco: Accept our heartiest wishes for a completely successful meeting.

American Gas Light Journal.

The President then introduced Mr. M. C. Osborn, of Santa Cruz, who read the following paper, entitled

THE RELATIVE POSITION OF CONSOLIDATED GAS AND ELECTRIC LIGHT PLANTS.

I have been asked to contribute a paper on the lines indicated in the above title. As far as my knowledge goes, no similar paper has been presented at any of the several Gas Association meetings. Some of us

are born story tellers, while others have to be pumped by questions, to bring out what their experiences have taught them. So, in my case, I present a number of questions, and answer them the best I can, from the experience gained in my works; and I shall start by asking the question: What are the first impressions of a gas man on taking charge of a consolidated plant?

The life of the gas manager, when in his works, is comparatively quiet, the bubbling of the hydraulic main being the only noise to break the stillness, but on entering the electric station his sense of hearing is disturbed by a variety of noises caused by the rapid revolving of machinery which at once fascinate him. Instead of pipes to conduct gas there are wires to send out the current, with meters, as in the gas works, to measure the output, with rheostats to regulate the pressure in the place of a gasholder, and he finds at once that the gas man has the advantage of having a reserve of his commodity; that while with electricity perpetual motion is necessary, as the current is on only when the plant is in operation, in the gas works a continuous service is given, and he sees that this is a strong point in favor of gas as against the electric light. As he goes from the station he finds a network of wires on poles, run in a promiscuous manner, instead of pipes that are underground, put out of sight by plans that have an air of stability about them. He now comes to the consumer and finds that the majority use electricity. He at once asks himself why it is that gas has lost its popularity as an illuminant.

The principal cause of this is that when electricity first entered the field it found that gas had possession, and the electric promoters in making concessions to the consumer to get the business, established a "flat" rate for their light, so that while the gas meter registered the amount of consumption, restricting the consumer in the use of gas, in the use of electricity there were no restrictions. If the restrictions were reversed, electricity by meter and a flat rate for gas, there is no doubt that the output of gas would be satisfactory.

If this was the condition of affairs the consumer would not say that electricity was safer, cleaner, gave out less heat, and was more convenient, in making his comparisons of the two lights, but would take the one that came the cheaper. Take out the gas meter and let the consumer take his choice of the lights at the same rate and gas will hold its own as far as output is concerned, but they will be on the same level as to their earning capacity. Meters must be between the producer and the consumer for either of the lights before they can be put on a paying basis. The gas meters are in place for the electric consumer to fall back on, while gas can always be depended on and needs no substitute. The electric consumers who have had flat rates are spoiled thereby for paying for their lights by a meter rate, and it is very difficult to get them back to it. It is also difficult to establish an equality of rates as long as the above methods exist, and the smaller works will have to adopt the electric meter as they are doing in the larger cities, so that the manager can treat a gas consumer as he does his neighbor who uses electricity.

An important question is the economy of running a consolidated plant as compared with running them separately.

If both plants are not on the same ground, as is the case in my works, I find that, outside of management and office work, the works are separate and distinct from each other, and, as far as labor is concerned, that the electrical man takes no interest in the gas works, and that the ordinary gas house stoker will never be available in an electric station. That by reason of a limited output of gas the residuals bring a good price, and it does not pay to consume them. I find that the manager has not much time to devote to the gas works, as both the office work and the manager's time are consumed at the electric end of the business. The cost of repairs and the loss from deterioration are much greater in an electric plant than in a gas plant, with the same output. The gas business has been so long established that gas can be manufactured at a minimum of cost, while its competitor is still in its infancy, and improvements in electrical machinery are constantly being made, that we must have to give a good service, so that the cost of what might be called its maintenance is much greater than that of gas where electricity has to be generated by steam.

The manager having the two lights will naturally ask himself, what can I do to bring the gas works back to its former output?

He would not run opposition to himself by asking his electric consumers to use any device for gas consumption that would in any way interfere with his electric business by reducing his consumers' bills, and there being no advantage to the consolidated plant in the use of the latest improvements in gas burners, the only avenue open for the increase of gas consumption is the use of gas for fuel purposes.

I will not enter upon the discussion of gas stoves, as a paper will be read on that subject, but will simply give you the record of 31 stoves that I placed since the 1st of March. Their average consumption for the month of June was 1,100 feet. The smallest consumed 400 and the largest, 3,000 feet. They have been very satisfactory to both the consumer and my Company.

In conclusion, I shall anticipate a question from one of the gas fraternity. Of the two branches of the business, which does the manager prefer, gas or electric?

I would take the gas works as a business proposition, as it is my belief that electricity for incandescent lighting, generated by steam, will never be able to compete with gas and pay the same rate on the investment. As far as the mechanical part goes, electricity is preferred. As before stated, it is still in its infancy, and its possibilities are beyond the calculation of man. Rapid advancement is being made in its application for light and power, so that the manager's attention is at all times directed to his electric plant that he may keep up with the times.

Discussion.

The President—Many of our members are situated as Mr. Osborn is at Santa Cruz; that is, running gas and electric plants together. I, therefore, hope that this paper will have full discussion. Can Mr. Adams, of Stockton, tell us anything relative to the effects of electricity on gas in Stockton?

Mr. Adams—We have a 100 horse power gas engine at present in Stockton, and are fitting it up to run with natural gas for electric lighting.

The President—Can Mr. Steinmann tell us something of the effects of electricity on the gas business in Sacramento?

Mr. Steinmann—We have a competitor at Sacramento, in the shape of the Folsom Water Power Company, and are fighting them with electricity generated by steam and we find it a losing game. They are telling the consumers they will give them two months' light for nothing, if they will take the arc lamps for $4, $5 or $6, while they are disposing of their incandescents at five and six cents per thousand watts. We find that our output for day consumption, in shape of gas as fuel, is gaining all the time. We are selling gas there at $2.50 per thousand, and putting in separate meters for people who are using gas stoves. The South Yuba people expect to get there about the first of October with another water power plant, and I expect there will be incandescent lighting for about three cents a thousand watts. The supply is greater now than the demand. The Folsom Power Company use about 300 horse power for their street cars, and they have about 2,000 besides that, too. They have a contract with the city for $5.75 per month, on a moonlight schedule, for 2,000 candle power arcs, which will expire about the first of November.

Mr. Miller—In San Bernardino we are supplying gas at $2.50 per thousand, and are making money. We have competitors giving an incandescent all night at $3 per month, and they are running behind. We have a tally kept with the consumers, and know exactly how many men they employ, and we make up a statement of what they lose. We find that we are making a little money with gas at $2.50 in competition with an arc light all night for 15 cents. It shows that there is some demand for gas, no matter at what price it is disposed of.

Mr. Crockett—I suppose a great many gentlemen here who are running gas works and electric plants can give us information. I presume you have heard that I have gone into the electric light business myself. I have no plant yet, but expect to have it soon. In a large city of the size of San Francisco, for the past one or two years, we have felt the influence of the electric light very much, because they were taking the business in the center of the city, and gave us the business on the outside, but we found that they reached the limit. Their underground lines cost about $37,000 a mile, say, and it was impossible for them to go to the outside districts and do it and make any money. I have gone through their books and know exactly what they have been able to do, and on the inside of the city they can make money, but after they get beyond a certain limit there is no money against $1.75 for gas. Last year our business has steadily increased. Although we had reduced the price from $2 to $1.75, making a net loss to us of $220,000 per year on our business, we found that this year we picked up, and our sales are almost equal to what they were when we were selling gas at $2.

While I was in Paris I noticed that the entire city seemed to be lighted by electric lights. If, however, you will take the last report of the Paris Gas Companies, you will see that the gas business has increased in Paris at a tremendous rate, and that they have put out there some 230,000 or 240,000 gas stoves—last year they placed 39,000. They have an absolute franchise in Paris which nobody can interfere with. They get a certain price for their gas and they are allowed 10 per cent. on their stock (they have to furnish all the street lights of the city of

Paris free), and whatever is left is divided between the city of Paris and the Gas Company. Last year the city of Paris got $1,694,000 from the Gas Company, besides having the streets lighted free. That does not look as though the gas business was going down. If anybody who has a gas works will stick to it he need not fear the electric light, especially if he will try to induce as much day consumption as possible. I think he can go right along with the gas business, and he need not fear that there will be as much consumption as possible.

The President—I think Mr. Burrows can throw some light on the subject.

Mr. Burrows—I do not think I can say anything to enlighten the gentlemen present at all. I am running both gas and electric works, and will say that I found it very hard work to keep my electric business up to what it should be. The gas has interfered so much the last year that we have lost numbers of electric light consumers to it. We make no special effort in the light department to consume gas, because we want to keep the business in the electric department up as much as possible. I hold that electricity manufactured by steam can not compete with gas, and I do not believe it can compete with gas anywhere in the United States where they have the Welsbach burner in use and properly managed. I hold that no small town can make money on electric lights without having a good city contract. I do not know of a business anywhere where an electric plant will pay expenses without a city contract. I agree with the conclusions of Mr. Osborn quite fully and heartily, and think that he made the case very plain.

Mr. Britton—A year ago we were running a very prosperous electric lighting plant and had all we could do to furnish all the lighting that was called for in our territory. The Welsbach burner came in, and those lamps have been ploughing a path through our electric business that is worse than a St. Louis cyclone. That branch of our business has fallen off nearly 30 per cent. in commercial lighting, owing to the Welsbach burner, and our rates in Oakland are lower than any place in the United States for arcs. We could not compete with the Welsbach burner. I tell you that as an encouragement, for you can fight the electric light with the Welsbach burners. The candle power they give is something that cannot be injured or hurt in any way by opposition or arc or incandescent lighting, dollar for dollar.

Mr. Powers, of San Diego—I might state, Mr. President, that I was originally a gas man, and that the electric light was forced upon me. I made the most of it, however, when I took it, and I will say without hesitation that it has been a burden ever since I did take it; and, as Mr. Burrows has explained, it has been a greater burden to us since the Welsbach light has come into general use. When a man who is paying $12 to $15 per month for an arc light tells you to take it out and puts in Welsbach lights which answer the purpose just as well, at a cost of about $1.50, there is not much money for him in an arc. To illustrate: We had an opposition there, and to preserve the opposition we got it in our works. We did not buy it, but we furnish them the power. The man is running it to the best of his ability, and I understood the other day that one of our bitterest enemies, who was one time a member of our Common Council, in order to hurt us the stronger, had his "damned old meter" ordered out, and he paid $15 per month for his incandescent light. Happening to see him the other day, I asked him about the Welsbach light, and he said, "It is perfectly satisfactory; a person who cannot use gas at that price might just as well give up business." I did not ask him what he was paying for gas, but I knew he had been paying $15 per month for the incandescent light, so when I went back to the office I asked the Secretary, who said the man was paying $2.50 instead of $15. That is the difference between the two. Hence, you gentlemen who have competition in the way of electricity have nothing to fear. I believe it would be well to have the electric light and the gas and furnish them as required to try and keep the field. Stop useless competition, but if the circumstances are such that the gas company is not disposed to do it, or does not see fit to do it, I think that the money is to be made in the gas. That is my experience.

Mr. Parker—I would like to hear Mr. Knight's experience in this matter.

Mr. Knight—I have gotten so old that I am nearly at the end of the gas business. I was one of the first who started in the business here (1854), and have followed it from that time on up to this. In 1858 I built a small works at Marysville. We ran it as gas works and got a good price at first, but we kept constantly coming down in the price. A few years ago an electric light man stuck up 12 lights in the streets. He made a proposition as to what he would do in the matter of charging for the lights. I thought the scheme might hurt the Gas Company a little, so I came to San Francisco and saw Mr. Rowe, who agreed to fit us up with an electric plant. I got my works up some 30 days before the other man got his up, and I got some good arc lights on. He did not get started, and sold out his poles and wires for $1,000. We ran along on arc lights, and nobody seemed to want incandescents. Finally a home company started up with a capital of $20,000—I think they paid in $9,500. Meanwhile I found out it was likely to be an actual "go," so I came down again to see Mr. Rowe, with the result that I got my works going some six weeks before the home company got theirs. Meantime, they agreed to furnish the incandescent light until 10 o'clock, for $1 per month, each being a better light than the Gas Company could give; those burned until 1 o'clock were to cost $1.25. A day or two before he started up I increased the quality of my gas to as high a point as I could put it; and where, for instance, I had six gas lights, and he put in six glows, his did not compare with mine; in fact, he had to put in ten. My incandescent lights I ran at as high a voltage as I could, and burned out two or three of those lights every night; but the other man's lights did not come up to them. I finally broke the Company and it was sold out by the sheriff. They paid $7,500 for their engine—it was a nice one of 60 or 70-horse power—and I purchased it for $3,500. They had a very nice plant—the Thomson-Houston incandescent type—which was bought on the installment plan, but they paid only one installment. After paying out $9,500 they quit, and still owed $2,600. Since that time the Gas Company and the Incandescent agree very well. (Laughter.) We have one set of men to run it, and if the public want gas they have it, and if they want the incandescent light they can have that; and both of them run well. We have one of the best light systems in the State. My gasfitter is the electrician, and my engineer used to work on the street with pick and shovel; but I placed him on the engine and pay him $75 a month. Our electrician also worked on the street, and I placed him in his latter position at $60 a month. We have no bad lights, burn out no machines, and everything goes along very well. If I had a gas works in a place where there was any chance of anybody else coming in, I would surely establish electric lighting with my gas lighting. An agent came to me and asked if I had any objection to putting in Welsbach burners. I said, not in the least. He said he wanted to appoint an agent. He sold 50 or 60 Welsbach lights, and they have taken them nearly all out. That is our experience with Welsbach burners. It has paid since the beginning, and it pays now.

Mr. Parker—The evidence so far given seems to favor the joint production and sale of electricity and gas. I would, therefore, like to ask if anybody's experience is different, when the profits are considered.

Mr. Steinmann—We invested about $300,000 in electric plants at Sacramento, for which I was yesterday offered $50,000.

Mr. Gillespie—We have had a rather sad experience in the electric light line in our town for the past eight years. Very shortly after the Gas Company was established an electric light plant was erected. The two combined, and the result was that they captured the city lighting, which our Gas Company formerly did. Quite an expensive incandescent system was also introduced in opposition to our gas and electric lighting. The result was that for a time they cut very heavily into our gas business. The electric lights were a novelty and everybody seemed to want them. Things ran along in that way for a couple of years. For the first year we perhaps ran a little behind, but we were ahead the next year, and since then we have kept on gaining, while since the introduction of the Welsbach burners we have about knocked out the incandescents of both our own Company and those of the opposition. That has been our experience with the electric lighting. The consumption of gas through stoves has steadily grown, and that has helped us out; it has proved to be a very profitable branch of our business.

Mr. Petch—My experience is that under ordinary circumstances gas will be a better money maker than electric lights. Up in Eureka we are perhaps more strangely situated than in most other places. We have regular gas works and we have regular electric light works. About three or four years ago there came an opposition. After spending about $60,000, the opposition concluded they could not make any money at it and we have the plant to day. When they came in there they ran the price of electric lights down to such a figure that no one could possibly make any money, and they finally reached such a low rate that they took most of our gas consumers away from us for a time. They reduced say about two-thirds. It was useless trying to compete at the prices they put on electric light. After we consolidated with them we were fortunate enough to make a deal with a mill, and while we furnish them steam they furnish us fuel. Being thus situated we can still afford to sell the light pretty cheap. My experience is that if it were not for that fact we could make little money. We

sell lights up there very cheap, and I think that the gas business is a good thing for gas men to stay with.

Mr. Cressey—From all that the gas men say, it seems to me they have been saddled with a large amount of electrical machinery. In our place we had an opposition gas plant and had a lively competition for a year or two. Neither of us could make any money, and we finally came together and divided the profits. I soon found that our gas part was making money while the electric man was losing, and I did not like that. At the end of one year I, therefore, dissolved that partnership and ran the gas business alone. The result is that the electric light must close up, and the plant can be bought to-day very cheaply. It has been my belief that those plants should not be purchased by us. If I could buy that plant to-day for one-third its cost it would, in my opinion, only be tying our money up in something for which we have no use. As soon as we had bought it some other man would come along and again start an opposition. It seems to me it is better to permit the electric light plants to stand idle, while we run our gas plants right along. All our money is in the gas business, and when we go into electric lighting we divide our money. My experience is that it is better to run our part of the business and stay with the gas. If you go on purchasing electric machinery you tie your money up, and after a while you have so much money invested that you can not make anything out of the gas business. Electricity cannot compete with us, as against Welsbach burners, nor has it been able to do so anywhere. We light our streets with the Welsbach burner.

Mr. Miller—I think this question varies in different localities. In some cities gas works are better, while in others the electric light properties are better. If I owned the gas works in any town and could purchase an electric plant for one-third of its cost, I think I would buy it, lest some bright man came along to buy it, thus starting an opposition. That thing occurred two or three times in the town of Vallejo. An electric light plant that was started there a few years since was soon foreclosed by the sheriff. My impression is that the plant cost some $20,000, and was sold for some $1,500 or $2,000. It was a terrible failure, and, to the average intelligent man, it looked as though an electric light company could not be started there again; but to-day I see that they are advertising a new one. We had an opposition in the town of Santa Rosa some seven years ago, which was fought for some two or three years, and their plant was finally secured for about $1,500. Notwithstanding that fact, another company started in opposition. That has been the experience in a number of towns, and if the plant is left somebody will come along and start again. That is why I say that if the plant can be bought for anywhere near a third of its cost, that it is well to buy it if the town is growing. There is always a demand for electricity and a demand for gas. We noticed it in Eureka when we had a very strong competition in electricity. They wired houses free, but still we sold no less gas than we are doing now, and the electric company were giving all possible inducements to induce people to change. I therefore think that an electric light man cannot say that he can beat a gas man, or a gas man that he can beat an electric light man. There is a certain demand for each light.

Mr. Steinmann—In Sacramento the Capital Gas Company has bought out three companies, and still they come. First, we bought out the Brush Company; next, the Thomson-Houston, and then we bought the Waterhouse. We now have the Folsom Water and Power Company and the South Yuba Company is coming. In fact, the Capital City is becoming a regular Russian city; there are so many *poles* there. (Laughter.)

Mr. Cressey—If you buy out the electric light company the great howl is that you are creating a monopoly, and that the public is being abused and done up generally. They then say they will get some enterprising man to come in and oppose you. If, however, you leave idle an electric plant that was closed down, they cannot say that you have a monopoly. We can say, "There it is; if you want to use it, do so." We can say we don't want to interfere with that man's business, and that we don't want him to interfere with ours. If you buy out the electric light the people then talk of municipal ownership. I simply say to them, "If you folks want to buy it out you can do so, and do the best you can." I think it stops this howl and cry of monopoly.

Mr. Parker—I agree with Mr. Cressey that we do not wish to be known as a monopoly. We quietly waited at Napa for one of them—the West Coast Electric Light Company—to die, which it did. Then Mr. Taylor came up to introduce the Thomson-Houston Company. We simply put our wares on to the market in opposition to theirs, until the last six months, when they stepped in rather vigorously in our line and operated on our largest consumers; and now I understand the Superintendent has orders to hold the consumers he has and light them for nothing. Still, with the Welsbach burner, we can hold our own.

Mr. Britton—I would like to ask a general question of every gas man here who is running an electric light plant in connection with a gas plant, whether, from the present condition of his business, he would not be enabled to pay a better interest upon his investment had he let the electric light business alone. In other words, will not every gas man present here to-day say that, since the introduction of electric lighting, say 12 years ago, when it commenced to come in with any force, that from that time to this his sales of gas have increased more or less? None of you have gone back. You were at that time making a good interest upon your gas plant. You were afraid of this ghost that was coming up, but if you had let it alone you would be making more money to day, and the other fellow would not be making as much. And right here I want to say that a great deal of the losses the gas men have been compelled to meet during the past 10 years has been due, not to the legitimate competition of electric lighting, but to the efforts of manufacturers and agents to sell their apparatus. They are responsible for our losses, and not the business itself; because I believe there is no lighting proposition to-day that can honestly compete with gas for lighting. The unit of candle power considered, gas is cheaper than electric light, either by water power or steam power.

Mr. Miller—I know several consumers of electricity who have changed in private houses from gas to electricity. In Mr. Britton's own territory I know a gentleman who has 1,000 incandescent lights in his garden; but I do not think that his bill has caused him to stop. It is not a question of cheapness half the time. Take such places in this city as the White House, Raphael's and all like places on Kearny street; in them they would not use gas. A great many people want electricity. For that reason, if it will pay in private enterprises, it will pay the gas companies to do it. If Mr. Britton had not been supplying such people with electricity, he would probably try to keep them, but it would be at a greater loss. I think you will find in San Francisco all the finest residences are being wired, and the same is true in Oakland, even if the cost is twice that of gas.

On motion of Mr. Crockett the thanks of the Association were tendered Mr. Osborn.

(To be Continued.)

Review of the Proccedings of the Thirty-Sixth Annual Meeting of the German Society of Gas and Water Engineers, Held at Berlin, June 16, 17 and 18, 1896.

The first session was held on Tuesday, June 16. The Chairman, Director General W. von Oechelhaeuser, of Dessau, opened the meeting and greeted the large assembly, calling attention to the present occasion, when this, probably the oldest of the German peregrinating Associations, with its important local branches, appeared as an exhibitor, with an independent Exhibition building, at this notable Industrial Exhibition, showing the great results and successes which the various branches of the represented industries had attained in every direction during the past. The exhibits would prove that the gas industry, instead of showing marks of senility, appeared to be full of youthful strength and renewing vigor. He then recalled the "going home" of two noted South German fellow craftsmen, viz., Dr. N. H. Schilling, of Muenchen (Munich), and Simon Schiele, of Frankfort a. M., and paid a tribute to their worth.

After welcoming the visiting craftsmen and guests of honor of the Association, the Chairman reviewed the development of the gas industry since the previous Berlin meeting, calling special attention to the at one time feared, but now recognized beneficent, effect of the electric light upon the field of lighting, where it could not be considered as a competitor but rather as a supplement, and where its success had rather added new life than the at one time apprehended deadening effect upon the older branch of lighting. As a proof of the statement he quoted from the latest published "Statistical Communications" of Dr. E. Schilling, concerning an inquiry made of the 68 largest German cities, which resulted in showing that, whereas during the 12 years preceding 1883 the increase in gas sales had been 30 million cubic meters (1,059,420,000 cubic feet), the increase for the 12 years after 1883 at the same places had been 59 million cubic meters (2,083,526,000 cubic feet), or nearly double. The development of the incandescent gas light also gave evidence that illuminating gas still maintained the lead in the lighting field and had not surrendered the supremacy to gas for heating or power purposes. While 13 years ago only two 8-horse power gas engines were found in use, at the present day 200 and 500-horse power gas motors were being operated, and found espe-

cially useful in central electric stations, and not alone in the stationary line, but for locomotive purposes gas motors were beginning to be extensively used, as shown by the building of a number of gas railways; and a self-contained gas locomotive (one producing its own gas probably) was about to be tried experimentally in the near future. For water works gas motors were well known to be effective for some time past. The commercial branch of the gas industry had kept abreast of the technical part, and it was interesting to note that such a monopolized business, as the gas business was regarded to be, yet depended very largely upon the current prices which prevailed in the markets of the world for the returns from the by-products. The simple Gas Director Superintendent has become in many instances the "Gas, Water and Electrical Works Director," and thus peacefully are joined in one union the branches of various industries which are established in many places. One of the strongest branches of the general Society was even now known as the "Society of Gas, Water and Electrical Engineers." He also recommended that steps be taken for the education in the technical practical branches of the Societies specialties to supplement the knowledge gained in high schools, to better fit the graduates for the work that was before and expected of them. He closed by expressing the hope that the present exceptionally large assembly at the principal meeting of the Association would again give evidence of the aim of the Association to not only maintain the standard of excellence of the gas profession at its present height, but that it felt called on to continue this effort with increased energy.

Professor Wedding then read a paper on "The Origin and Using Up of Light Waves," touching upon the Roentgen rays and the Tesla light, which latter, he thought, had yet a long road to go over before reaching the point of practical applicability. After breakfast, Herr Soehren, of Bonn, read a paper on the "Auer Gas Glow Light." He was followed by Mr. Koerting, of Hanover, with a paper "Concerning the Justification of Employing Gas Motors for the Production of Elec trical Current." He pointed out that the quantity of useful energy obtained from coal is twice, and three times, as great when it is converted into either illuminating or power gas, and thus employed in gas motors, than what can be expected when used to produce steam and converted into power, even through the best of steam engines. The useful effect obtained from coal by converting into "power gas" is, with 100, 50, and 10-horse power gas motors, relatively 6.9 per cent., 4.6 per cent. and 2.2 per cent., and when converted into illuminating gas it is relatively 10.9 per cent., 9.9 per cent. and 9.1 per cent.; but when this illuminating gas is used to drive motors the relative effect is 12.9 per cent., 10.2 per cent. and 7.3 per cent. He showed that in a certain electric lighting plant the saving effected by using gas motors instead of steam engines amounted to very nearly one-half of what the cost for steam alone had been. This closed the first day's proceedings.

The second day's proceedings were devoted mainly to consideration of water works data and interesting matters concerning such.

The third day's proceedings were partly devoted to routine business of the Association, from which it appears that a successful Mutual Aid Fund is maintained by that Association. The fund showed an increase in such degree that the sums devoted to assist needy members could be increased. A paper on "The Growth of the Gas Works During the Past Decade," by Dr. Schilling, was then read, which showed that the business is in a thriving condition in the German Empire. Reports of Committees on various subjects were then read as follows: Committee on Photometry; Committee on Gas Meters; Committee on Water Meters, who were granted 1,000 marks to aid them in their work; Committee on Investigation Concerning Inclined Retorts, who were also granted 1,000 marks to aid them in obtaining information, and to report at the next annual meeting.

The Committee on Gas Heating reported. It appears from the report that the German Association had regularly engaged a lady, who visited various cities and gave lectures and instructions at large to induce the use of gas for heating and cooking purposes. The Committee reported that her efforts had had very good results, and 1,200 marks per annum were appropriated to continue the work for two years more.

In accordance with the Constitution of the Association, two new members of the Council of Administration were elected in place of two whose terms of office had expired by limitation. Of these Herr von Oechelhaeuser, of Dessau, was one. He was succeeded in the Chairmanship of the Association by Herr Koerting, of Hanover. After this, the paper on "Incandescent (Auer) Lights," by Herr Soehren, was con tinued and finished by a well sustained discussion. Then, Herr Merz, of Cassel, read a paper on "The New Gas Works at Cassell, with Especial Reference to the Installation of Benches with Inclined Retorts." In this paper—it is finely illustrated and published by R. Oldenbourg, Munich, Germany—the author remarks that, after trials with machine drawing and charging, they had found the ovens with inclined retorts to be much preferred. The heats were maintained evenly in every part of the bench, the labor is materially less, and results as to candle power and yield are entirely equal to results obtained in the former methods. The accumulation of tar in the lower mouthpieces was found quite small, and the author concluded by inviting those present to visit and inspect the works at Cassel. The paper was thoroughly discussed, Herr von Oechelhaeuser, Schimming and Merz participating. Dr. Bunte, of Karlsruhe, then proceeded, though, for want of time, only briefly, which was much regretted, to speak upon the bye-products, and "aid products," as he termed them, at gas works.

After the Chairman had thanked Prof. Bunte for his admirable discourse and the newly elected Chairman had expressed his regrets that the Association was obliged by its Constitution to elect another Chairman in place of so able a one as he who had for the past two years conducted the affairs of the Association, the proceedings were brought to a close.

The roll of those present showed the names of 683 gentlemen and 203 ladies.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Superintendent of Lamps (Mr. Swindell) of Baltimore, Md., has ordered the various lighting inspectors to return lists of all unused gas street lamps in their districts, with a view to notifying the Gas Company that the same must be removed. In ventilating his opinions over the matter Mr. Swindell said: "From general observation I am positive there are thousands of 'dead' lamp posts throughout the city. They disfigure the streets and are of no earthly use, because the electric light companies now have their plants in such shape that they give the best of service, and even in case of breakdowns the gas lamps would be of no use before the other service could be put in order again."

A CORRESPONDENT forwards the following: "Early this month the Common Council of Utica, N. Y., considered the matter of awarding the contract for the public lighting of that place by means of arc and incandescent electric lamps, according to the terms of the invitation to bidders. Only one proposal was submitted, which was made by the Utica Electric Light Company. The Company agreed to furnish arcs (2,000-candle power each, on an every and all night schedule) on the basis of a 3-year contract, at 35 cents per lamp per night; on the basis of a 5-year contract the price to be 34 cents per lamp. For incandescent lamps in public buildings, 3-year contract, 1 cent per hour for each 16-candle power lamp; for 5-year contract, the rate to be ¾ cent per hour per lamp. Accompanying the proposals was a bond in $40,000, with Messrs. H. D. Pixley and W. E. Lewis as sureties. Ald. Reagan inquired the contract price for arcs the last year, and was told it was 35 cents. Ald. Sessions moved that the Mayor and Clerk be directed to enter into a contract with the Utica Electric Light Company for a term of five years, the Alderman remarking that the difference of 1 cent per light, on the long and short term contracts, amounted to $8,225. Ald. Roberts moved that the bid be set aside as unreasonable, and that the Clerk be directed to re-advertise for bids in the New York and Buffalo papers. He urged this because he did not believe that many knew that Utica had asked for proposals for her electric lighting. This speech brought forth the suggestion or intimation from Ald. Reagan that Ald. Roberts' scheme would be a waste of money. Ald. Sessions said that he was in favor of competition, but thought that there had been sufficient time for contractors to know that the city was about to let a lighting contract. There had been plenty of discussion at previous meetings of the Council as to what was a fair price for arc lighting. Albany, for instance, was paying 35 cents for each arc. He thought 34 cents was fair to the city and fair to the Company. Ald. Reagan said the suggestion to advertise again was a reasonable one, particularly as the current contract did not expire until January 1st. Ald. Beatty said he thought the proposed letting of the contract had been reasonably and sufficiently advertised, but he also thought, as electricity for lighting was in its infancy, that in the long run the city would not save anything by binding itself to the named figures for a period of five years. He, therefore, moved that the contract be made for the 3-year term. Ald. Roberts moved that the contract be let for one year, which motion was declared out of order, as no bids for one year had been submitted. Ald. Beatty's motion for a 3-year contract was rejected, and a like fate met Ald. Roberts' motion to declare the received bid unreasonable. Ald. Sessions' motion, awarding the contract on the 5-year basis, was then adopted, Alds. Roberts and Conley voting against it."

A CORRESPONDENT at Sioux City, Ia., sends the following: "At a meeting of the Sioux City Council, held the first week in August, Ald. Siman, Chairman of the Committee on Lights, reported recommending the adoption of a resolution extending the franchise of the Sioux City Gas Light Company for a period of 20 years, from February 26, 1899. In the preamble of the resolution, substantially, the following reasons were given for its favorable indorsement: The authorities of Sioux City are about to cause the paving of certain of its principal streets with permanent paving which it is desired shall not be disturbed for a period of years for the placing of new gas mains, and the city desires the Gas Light Company to relay and enlarge its mains so that they will not only meet the present requirements of business, but provide for the growth of business and the demands of the public for a period of years, to prevent the annoyance, discomfort and loss to the city and its citizens in the tearing up of newly paved streets. The construction of the new mains will require the expenditure of a large amount of money. An ordinance referred to guaranteed to Andrew M. Hunt and his assigns the extension of the franchise. The Sioux City Gas Light Company does not desire at this time to make the expenditure necessary to construct the new mains, unless its franchise is extended to the end that the Company may be protected in the investment in the construction for the future needs of the city and its inhabitants. The resolution provides that at the earliest practical date after its passage the Company shall proceed to relay and enlarge the gas mains in all the streets which are about to be paved, wherever necessary."

JUDGING from the unanimous adoption by the Kansas City (Kansas) Council of the following resolution, that place is not to have an opposition Gas Company just yet: "Be it resolved by the Mayor and Council of the city of Kansas City, that the sum of $1,000 deposited by George M. Myers with the City Treasurer under provisions of ordinance No. 2720, approved October 23, 1895, be and the same is hereby declared forfeited to the city, said George M. Myers having failed to comply with any provision of said ordinance No. 2720."

UNDER the letter of the ordinance (No. 2720) referred to, Mr. Myers and his associates were bound to begin the actual work of construction on or before August 1, 1896.

A VERY queer proceeding is reported from Windsor, Ont. It seems that under the agreement between the authorities and the projectors of the Windsor Gas Company the latter promised to use cast iron pipe only for the street mains. When the first mains were laid the promise was adhered to. Subsequently, when the property was acquired by Detroit capitalists, and considerable main extension was determined upon, the engineers decided that wrought pipe would best serve the Company's purpose, and that style of construction was proceeded with. Mr. Kilroy, who is Chairman of the Windsor Board of Public Works, who must be nothing if not a stickler, requested the Company to cease laying the wrought article, but the Company continued to buy the wrought, whereupon another and higher official named Wills ordered the Company "to stop evading its contract." The whole thing is to be reviewed by the Council, who undoubtedly will uphold the Company. A more ridiculous piece of interference with legitimate work would be hard to search out.

UNDER the Act of last Congress, passed through the efforts of General Newton M. Curtis, representative from the 22d New York district, providing for the "better lighting of the St. Lawrence river," eight lights of the Pintsch compressed gas type, one of which was to be located in Ogdensburgh harbor, the others to be placed at suitable points between Ogdensburgh and Cape Vincent, were arranged for. So far five of the lights have been located, and the "river men" are well pleased with the results. The compressing chamber in the vessels arranged for will retain a gas supply equal to a service of 176 days.

THE Peoria (Ills.) Gas Light and Coke Company has purchased the property formerly owned by the proprietors of the "upper Woolner" distillery. It is situated on the Illinois river, close by the present holder station of the Gas Company.

THE Northwestern Gas Light and Coke Company, of Evanston, Ills., is extending its mains to the outlying district of Wilmette.

THE authorities of Pleasanton, Cal., are considering the advisability of establishing a gas works at that point.

MR. ABRAHAM L. BOGART, who will be remembered by many of the older members of the fraternity as the introducer in this country of electrical apparatus for the lighting of gas lamps, is dead. Deceased was also a pioneer in the introduction or gas cooking and heating stoves in America. He was in his 78th year.

THE Directors of the Wilmington (Del.) Coal Gas Company have declared a dividend of $3 per share, payable on demand.

THE Hastings (Neb.) Gas Light Company's new plant is completed and giving good satisfaction. The Company's business is steadily increasing. The local manager of the Company is Mr. J. E. Leadley, under whose direction the work of reconstruction was prosecuted. The rates charged by the Company are: For an illuminating supply, $2.25 per 1,000 cubic feet gross, with 10 per cent. discount for prompt payment; for a fuel supply, $1.90 per 1,000 net.

A CORRESPONDENT forwards the following: "Bids for lighting Wilmington, Del., were submitted by the Wilmington Coal Gas Company and the Wilmington City Electric Company, as follows: Wilmington Coal Gas Company, on a 1-year basis, $17.04 per lamp per year; 3-years, $16.86 per lamp; 5-years, $16.74 per lamp. Should the clause causing a forfeiture for lamps not lighted be omitted, the Company would reduce each bid 12 cents. The Electric Company's bid was much more detailed. For 500 or more incandescent lights the charge was to be at the rate of $18.71 per lamp per year, on a 1 to 3-year contract. For a 5-year contract the Company bid as follows on incandescent lamps: 16-candle power, $16.71; 20-candle power, $17.71; 24 candle power, $18.71. The bids for arc lamps were as follows: 100 or more, $125 each per annum; 150 or more, $120 each; 200 or more, $115 each; 250 or more, $110. On 3 and 5-year contracts the Company made the following bids: 100 or more lights, $115 each for 3 years, or $105 for 5 years; 150 or more lights, $110 for 3 years, or $95 for 5 years; 200 or more lights, $105 for 3 years, or $90 for 5 years; 250 or more lights, $100 for 3 years, or $85 for 5 years; 300 or more lights, $95 for 3 years, or $80 for 5 years; 400 or more lights, $90 for 3 years, or $75 for 5 years; 500 or more lights, $85 for 3 years, or $70 for 5 years. The monetary agitation was partly reflected in a communication from the Electric Company, which desired, in case of a long term contract, to have a provision made that in the event of general disturbance of values whereby prices become much inflated, augmenting the expense of operating, the contract might be modified to meet the changed conditions, or on three months' notice from the Company a new contract might be made. The Company suggested a 10-year contract under which it was said the city would have a saving on 200 lamps of $6,000 annually. Under prospective money agitation the Directors might prefer short contracts. The bids were referred."

THE proprietors of the gas supply of Paterson, N. J., announce that from now until December 1st street connections will be made free of charge. The service pipe will be run from the street connecting pipe to curb, for a distance not to exceed 30 feet, to those who desire to put in gas, whether they expect to use an extensive supply or not. The Company also announces that a complete gas cooker, suitable for the needs of a small family, can be put in for $9.

AT a recent meeting of the Directors of the Salem (Mass.) Gas Light Company the price of gas was reduced, from $2 per 1,000 cubic feet, with 20 per cent. off if paid on or before the 15th of the month, to $1.60 per 1,000, with 20 cents per 1,000 discount if paid on or before the 15th of the month, making the net price $1.40 instead of $1.60 as previously. The reduction is to take effect on and after October 1, 1896.

THE Chicago *Tribune* says that the Ogden Gas Company has let contracts for its gas producing plant, which is to be located at Hawthorne and Willow avenues, 200 feet north of North avenue and running to the North Branch of the Chicago river. The building and apparatus will occupy nearly the whole of a tract of ground having a dimension of 350 feet by 400 feet. It is the intention of the Company, according to Roger Sullivan, who is at the head of the Western Republic Construction Company, which is building the plant, to provide for an initial capacity of 1,000,000 cubic feet per day, and to so arrange it that the capacity can be increased to 3,000,000 feet per day. Contracts have just been closed with Messrs. R. D. Wood & Co. for the holders, with the Kerr-Murray Manufacturing Company for the purifiers, and with the United Gas Improvement Company for the generating apparatus. Thomas Gahan has been elected President to succeed John W. Lanehart, who died recently, and the claim is made that the Company will not be affected in the least by the death of Mr. Lanehart. Officers of the Company deny the statement that has been made frequently that

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THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR Jos. R. Thomas, C E.
ASST. EDITOR—T. J. Cunningham.
MANAGER—C. E Sanderson.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 32 Pine Street, New York.

The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.
PACIFIC COAST GAS ASSOCIATION.
TEXAS GAS AND ELECTRIC LIGHT ASSOCIATION.

TERMS:
SUBSCRIPTION—Three Dollars per annum, in advance.
Single copies, 10 Cents.

AGENTS:
New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, AUGUST 17, 1896.

(*Continued from page* 254.)

the Company was formed and the ordinance secured for the purpose of selling out to the Gas Trust. They say the Company will be selling gas by January 1st, and that contracts have already been made with 5,500 consumers for the use of gas as soon as the plant is in operation. The price of gas under the Ogden ordinance is fixed at 90 cents per 1,000 cubic feet."

AT the annual meeting of the Oakland (Cal.) Gas Light and Heat Company the following officers were elected: Directors, D. E. Martin, James Moffit, Thomas Crellin, John A. Britton and John T. Wright; President, D. E. Martin; Vice-President, John T. Wright; Secretary and General Manager, John A. Britton.

MR. H. E. MANN is engaged just now in superintending the erection of the water gas apparatus for the Hopkinsville (Ky.) Gas and Light Company, the contract for the installation of which was placed with the United Gas Improvement Company.

SOUTHERN advices, by way of Savannah, Ga., are to the effect that the proprietors of the Augusta (Ga.) electric street railway system have secured control of the local Thomson-Houston Electric Company and are bargaining for the plant and rights of the Gas Light Company, of Augusta.

MR. C. R. COLLINS, resident manager of the Seattle (Wash.) Gas and Electric Light Company, says, in speaking of the outlook for business at that point: "The Gas Company is going after all the business it can get, and we realize that we must pursue a liberal policy to get business these times. Just now we are spending $2,500 on our mains, which gives employment to several men, and, of course, the money is spent right here in Seattle. One part of the gas business does not seem to have been pushed in this section of the country. That is the supplying of gas for cooking. In Eastern cities it has proved successful, because it is cleanly and cheap. The Company has been renting stoves, but next fall we expect to sell them at figures that will induce people to buy outright rather than rent."

A Lighthouse Without a Lantern.

The most extraordinary of all lighthouses is to be found in the Hebrides, Scotland, on Armish Rock, Stornoway Bay—a rock which is separated from the Island of Lewis by a channel over 500 feet wide. On this rock a conical beacon is erected, and on its summit a lantern is fixed, from which, night after night, shines a light which is seen by the fishermen far and wide. Yet there is no burning lamp in the lantern and no attendant ever goes to it, for the simple reason that there is no lamp to attend to, no wick to trim, and no oil well to replenish.

The way in which this peculiar lighthouse is illuminated is this, says the *Marine Record*: "On the Island of Lewis, 500 feet or so away, is a lighthouse, and from a window in the tower, a stream of light is projected on a mirror in the lantern on the summit of Armish Rock. These rays are reflected to an arrangement of prisms, and by their action are converged to a focus outside the lantern, from where they diverge in the necessary direction." The consequence is that, to all intents and purposes, a lighthouse exists which has neither lamp nor lighthouse keeper, and yet which gives as serviceable a light—taking into account the requirements of this locality—as if an elaborate and costly lighthouse, with lamps, service room, bed room, living room, store room, oil room, water tanks, and all other accessories were erected on the summit of the rock.

The Market for Gas Securities.

There was a marked improvement in the market for city gas shares during the week, Consolidated being reported at the opening to-day (Friday) at 139½ to 140. Good buying sent the stock to 143 by noon, and the demand for it was active. It is very cheap at the figures quoted, in that the third quarterly dividend of 2 per cent. for the year will be declared in less than a fortnight. Furthermore, it is said that negotiations looking to a consolidation of the gas interests of the city are taking on a definite form. Other city shares are firmer, notably Standard preferred. Brooklyn Union Gas is at the ridiculously low quotation of 76 to 79, and the 5's are rated at 100 to 101. The Lester legal proceedings before the Attorney-General undoubtedly figure in depressing these securities, but the well informed are not disposed to take the proceedings in anything like a serious way. The stock is cheap.

Chicago gas recovered materially from the drop of a week ago; it sold before noon of to-day at 52. Bay State shows no change; Laclede is inclined to advance; and Baltimore Consolidated is weaker and quite uneven. Consumers, of Jersey City, is neglected; Indianapolis gas is about steady, and the Fort Wayne issues are in some demand, at figures somewhat lower than those of last week.

Gas Stocks.

Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.

35 WALL ST., NEW YORK CITY.

AUGUST 17.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$35,430,000	100	141	142
Central	500,000	50	150	..
" Scrip	220,000	..	100	.
Equitable	4,000,000	100	180	195
Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	200	220
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
Northern	150,000	50	79	80½
" Bonds	150,000	1,000	..	98
New York and East River	5,000,000	100	24	28
Preferred	2,000,000	100	50	65
Bonds 1st 5's	3,500,000	1,000	94	97
" 1st Con. 5's	1,500,000	..	80	85
Richmond Co., S. I.	348,650	50	50	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	71	74
Preferred	5,000,000	100	99	102
Bonds, 1st Mortgage, 5's	1,500,000	1,000	107	111
Yonkers	299,650	50	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	76	79
" " Bonds (5's)	15,000,000	1,000	100	101
Bay State	5,000,000	50	16	18
" Income Bonds	2,000,000	1,000	30	32
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	75	80
2d " " "	3,000,000	1,000	60	62
Buffalo Mutual	750,000	100	125	..
" Bonds	200,000	1,000	95	100
Central, San Francisco	2,000,000	..	95	..
Chicago Gas Co.	25,000,000	100	51¾	52
Chicago Gas Lt. & Coke Co.				
Guaranteed Gold Bonds.	7,650,000	1,000	94	94¼
Columbus	1,069,000	..	..	65
1st Mortgage	1,085,000	..	..	96
Consumers. Jersey City	2,000,000	100	..	78
" Bonds	600,000	1,000	97½	99
Cincinnati G. & C. Co.	7,000,000	100	196¾	197
Consumers, Toronto	1,600,000	50	184½	187
Capital, Sacramento	500,000	50	..	41
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	1,000,000	100	55	58
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490,000	..	..	..
Detroit	4,000,000	..	32	33
" Con. Bonds	4,312,000	..	..	82
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	..	85
" Bonds	2,000,000	..	..	88
Hartford	750,000	25	..	145
Indianapolis	2,000,000	..	115	130
" Bonds, 6's	2,650,000	..	98	101
Jersey City	750,000	20	180	..
Lafayette Gas Co., Ind.	1,000,000	100	..	92½
Bonds	1,000,000	1,000	85	90
Louisville	2,570,000	50	..	..
Laclede, St. Louis	7,500,000	100	18¾	19½
Preferred	2,500,000	100	..	80
Bonds	9,034,400	1,000	86½	88
Little Falls, N. Y.	50,000	100	..	100
Bonds	25,000	..	..	100
Montreal, Canada	2,000,000	100	200	.
Newark, N. J., Gas Co.	1,000,000	..	93	98
Bonds, 6's	4,000,000	..	123	..
New Haven	1,000,000	25	225	..
Oakland, Cal.	2,000,000	..	52	53¾
" Bonds	750,000	..	..	..
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	2,100,000	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	..	175
Paterson, N. J.	.....	25	99	102
Rochester Gas & Elec. Co.	2,150,000	50	..	..
Preferred	2,150,000	50	88	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	93¾	95
St. Paul Gas Light Co.	1,500,000	100	67½	70
1st Mortgage, 6's	650,000	..	84	87
Extension, 6's	600,000	..	..	..
General Mortgage, 5's	2,400,000	.	88	90
Syracuse, N. Y.	500,000	25	..	..
Washington, D. C.	2,000,000	20	250	..
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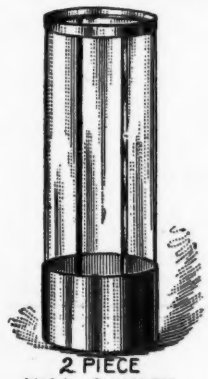

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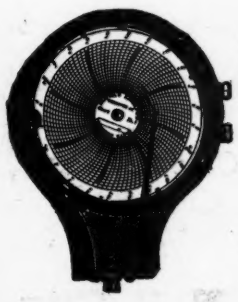

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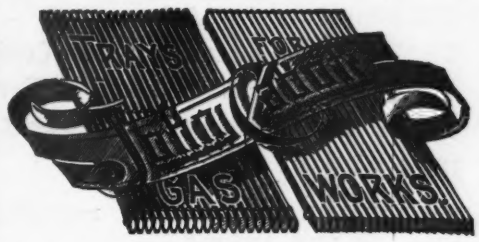

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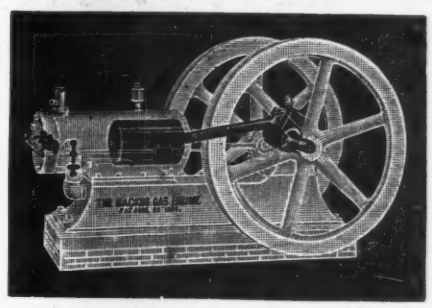

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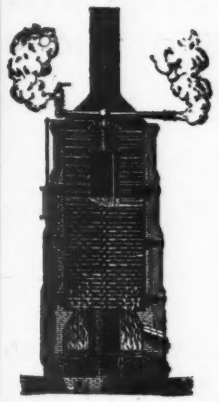

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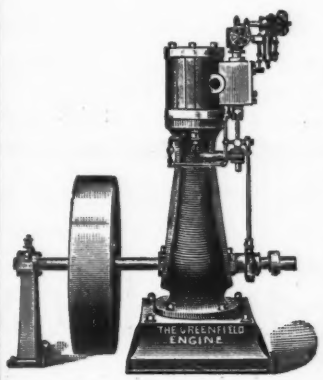

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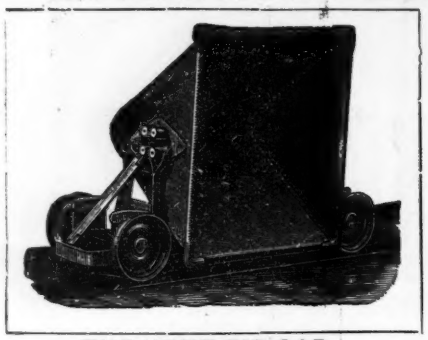

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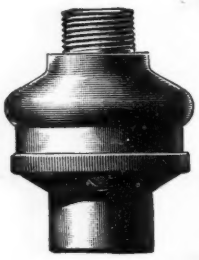

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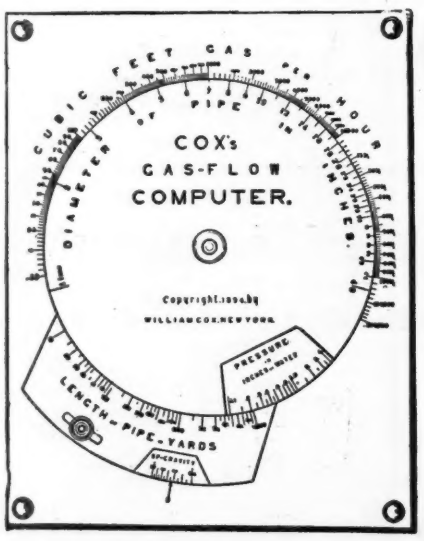

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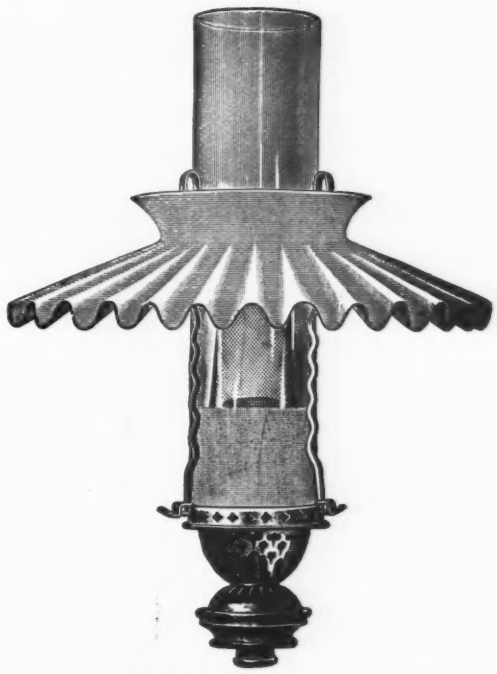

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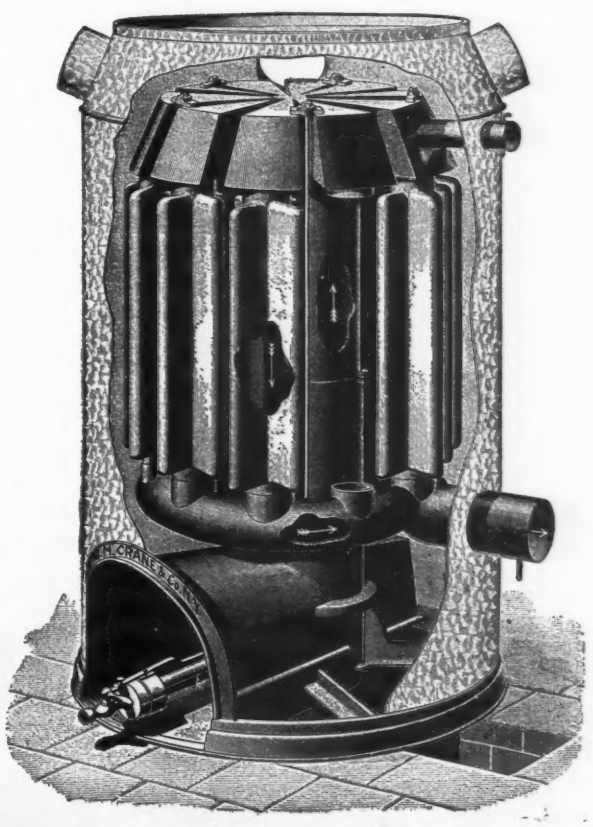

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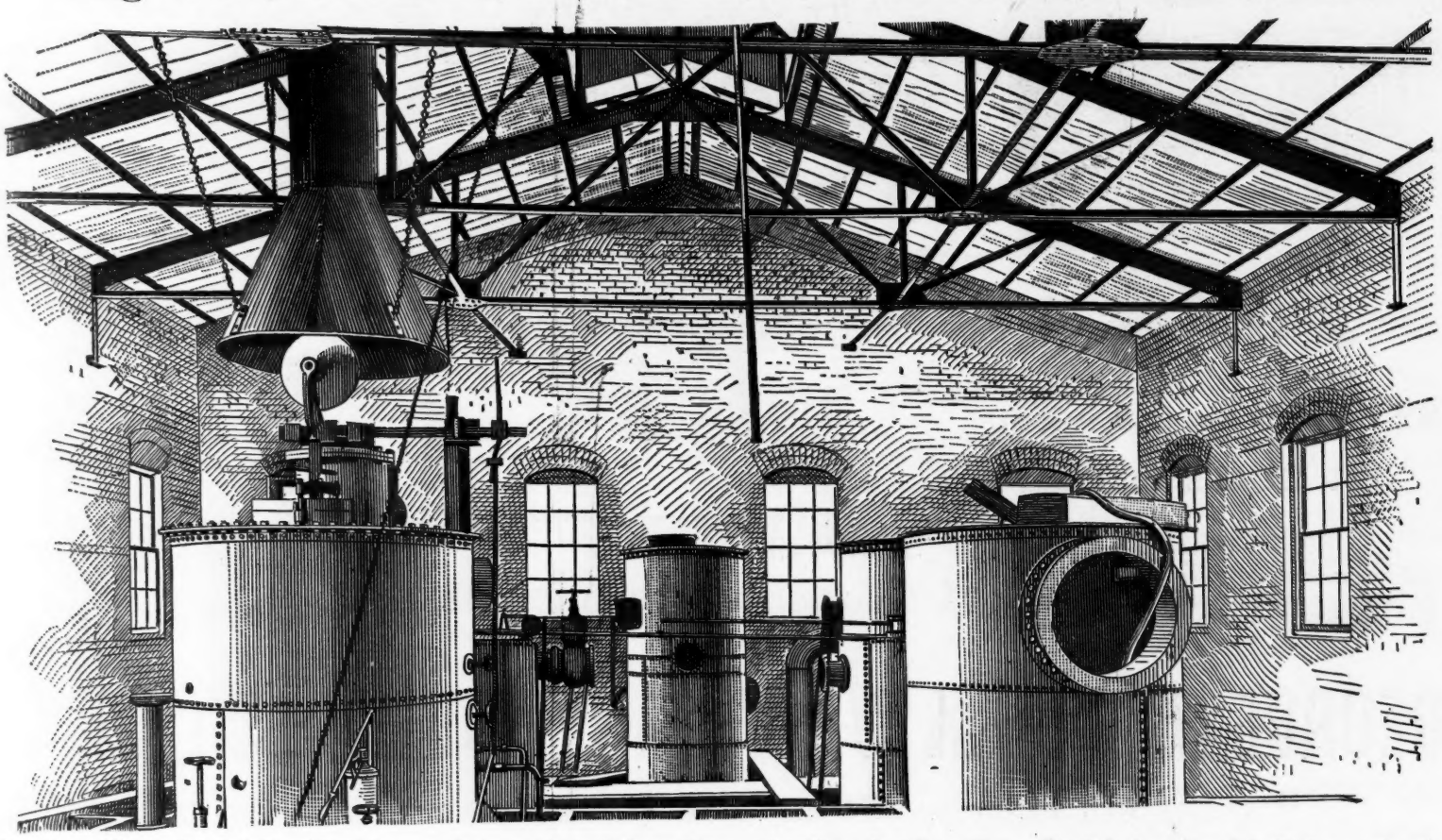

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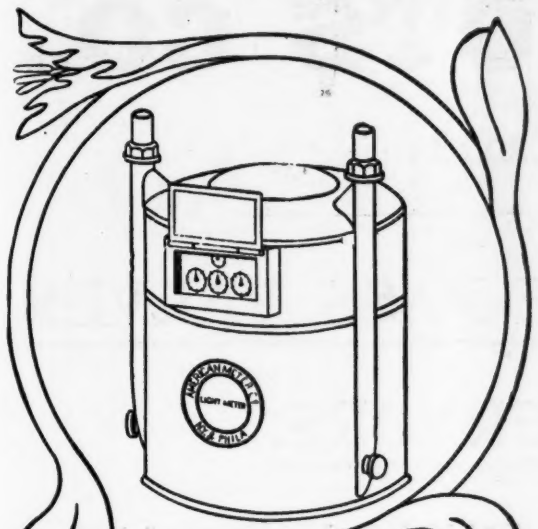

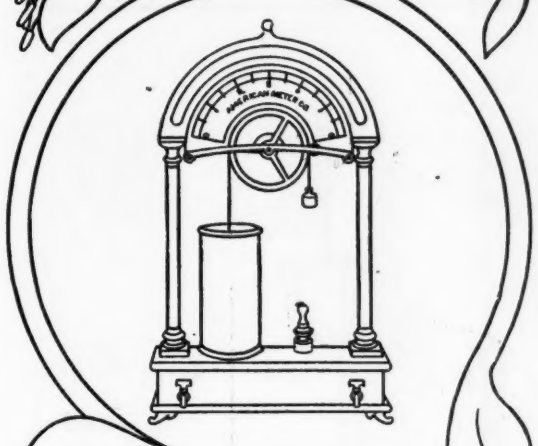

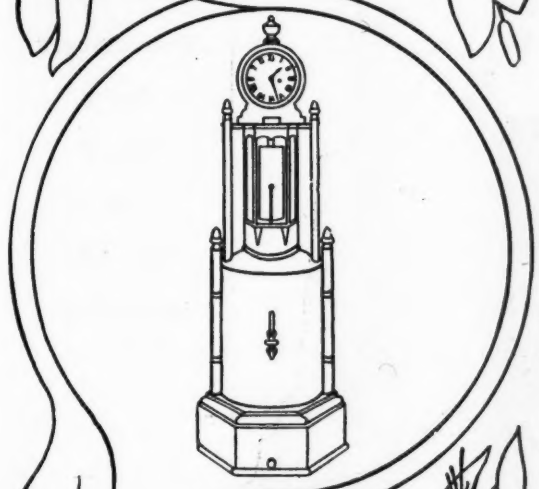

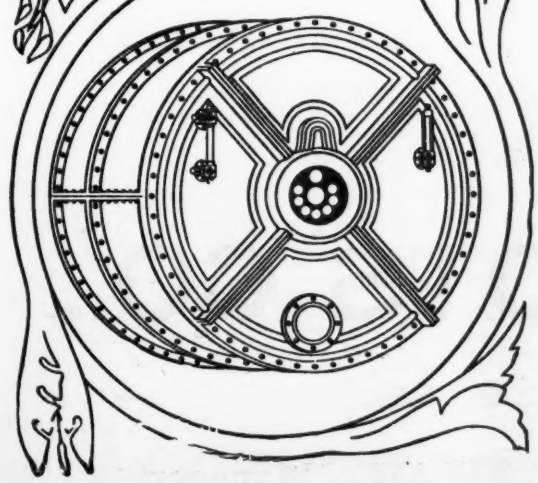

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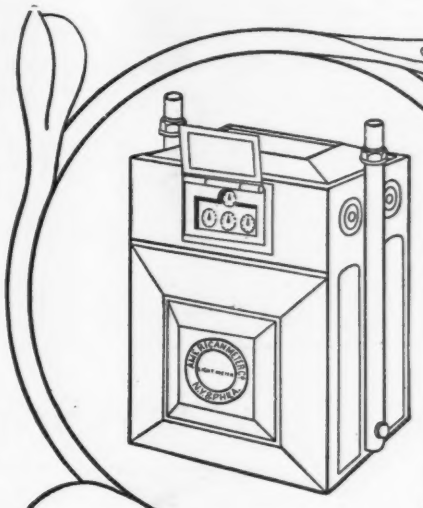
PUBLIC LIGHTING TABLE.

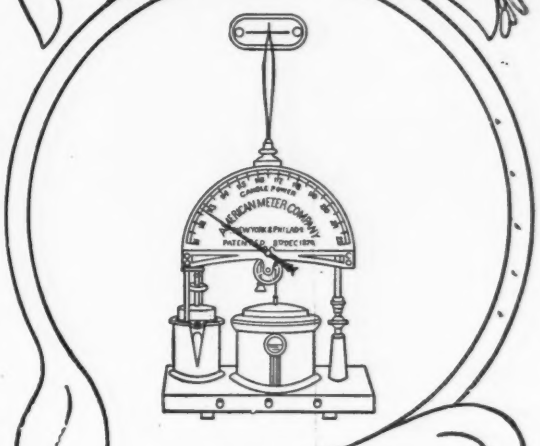
SEPTEMBER, 1896.

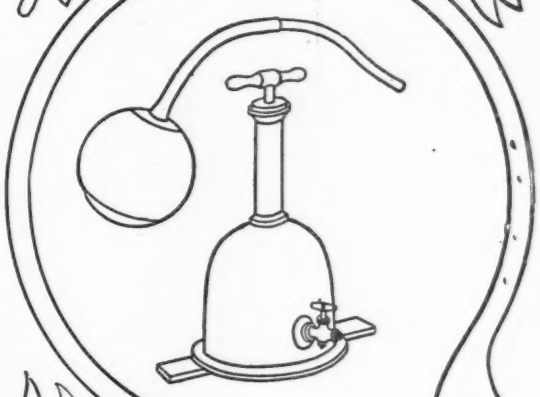
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Tue.	1	7.00 PM	12.30 AM	6.30	4.20
Wed.	2	7.00	1.30	6.30	4.20
Thu.	3	7.00	2.40	6.15	4.30
Fri.	4	7.00	4.30	6.15	4.30
Sat.	5	7.00	4.30	6.15	4.30
Sun.	6	6.50	4.40	6.15	4.30
Mon.	7	6.50 NM	4.40	6.15	4.30
Tue.	8	6.50	4.40	6.15	4.30
Wed.	9	6.50	4.40	6.15	4.30
Thu.	10	6.50	4.40	6.05	4.40
Fri.	11	6.50	4.40	6.05	4.40
Sat	12	8.10	4.40	6.05	4.40
Sun.	13	9.00 FQ	4.40	6.05	4.40
Mon.	14	10.00	4.40	6.05	4.40
Tue.	15	11.10	4.40	6.05	4.40
Wed.	16	12.10 AM	4.40	6.05	4.40
Thu.	17	1.20	4.40	5.55	4.50
Fri.	18	2.20	4.40	5.55	4.50
Sat.	19	3.30	4.40	5.55	4.50
Sun.	20	No L.	No L.	5.55	4.50
Mon.	21	No L. FM	No L.	5.55	4.50
Tue.	22	No L.	No L.	5.55	4.50
Wed.	23	6.20 PM	7.20 PM	5.55	4.50
Thu.	24	6.20	7.50	5.40	5.00
Fri.	25	6.20	8.10	5.40	5.00
Sat.	26	6.20	8.50	5.40	5.00
Sun.	27	6.10	9.30	5.40	5.00
Mon.	28	6.10	10 20	5.40	5.00
Tue.	29	6.10 LQ	11.20	5.40	5.00
Wed.	30	6.10	12.20 AM	5.40	5.00

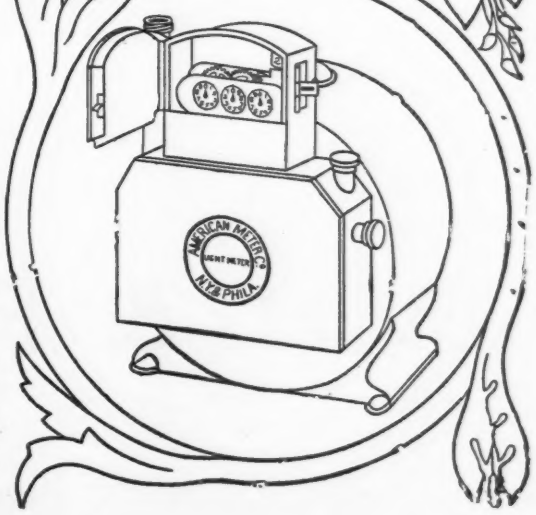
TOTAL HOURS LIGHTING DURING 1896.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	220.40	January	423.20
February	207.00	February	367 40
March	193.00	March	355.35
April	174.10	April	298.50
May	164.00	May	264.50
June	142.10	June	234.25
July	142 10	July	243.45
August	150.50	August	280.25
September	163.00	September	321.15
October	193.10	October	374.30
November	207.00	November	401.40
December	237.30	December	433.45
Total, yr.	2194.40	Total, yr.	4000.00









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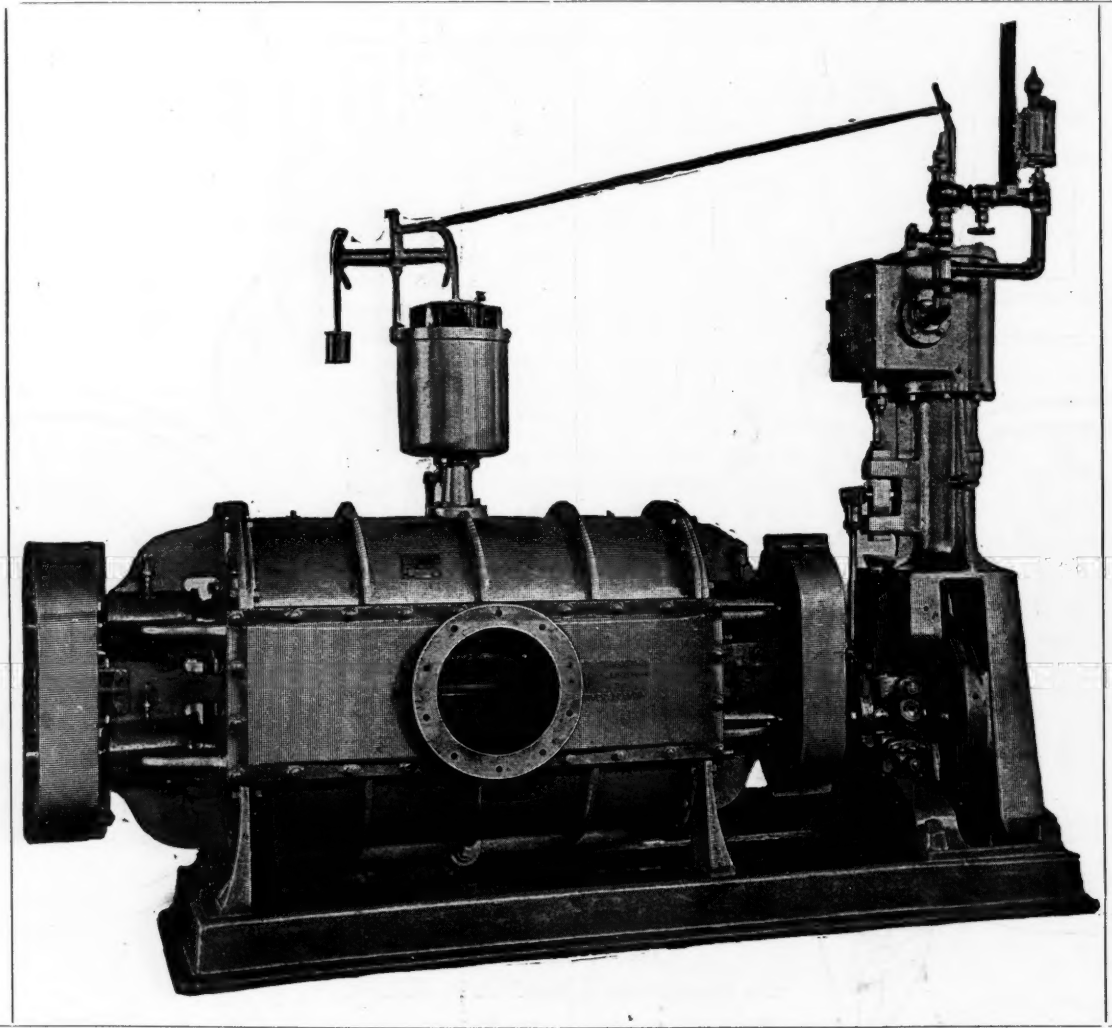

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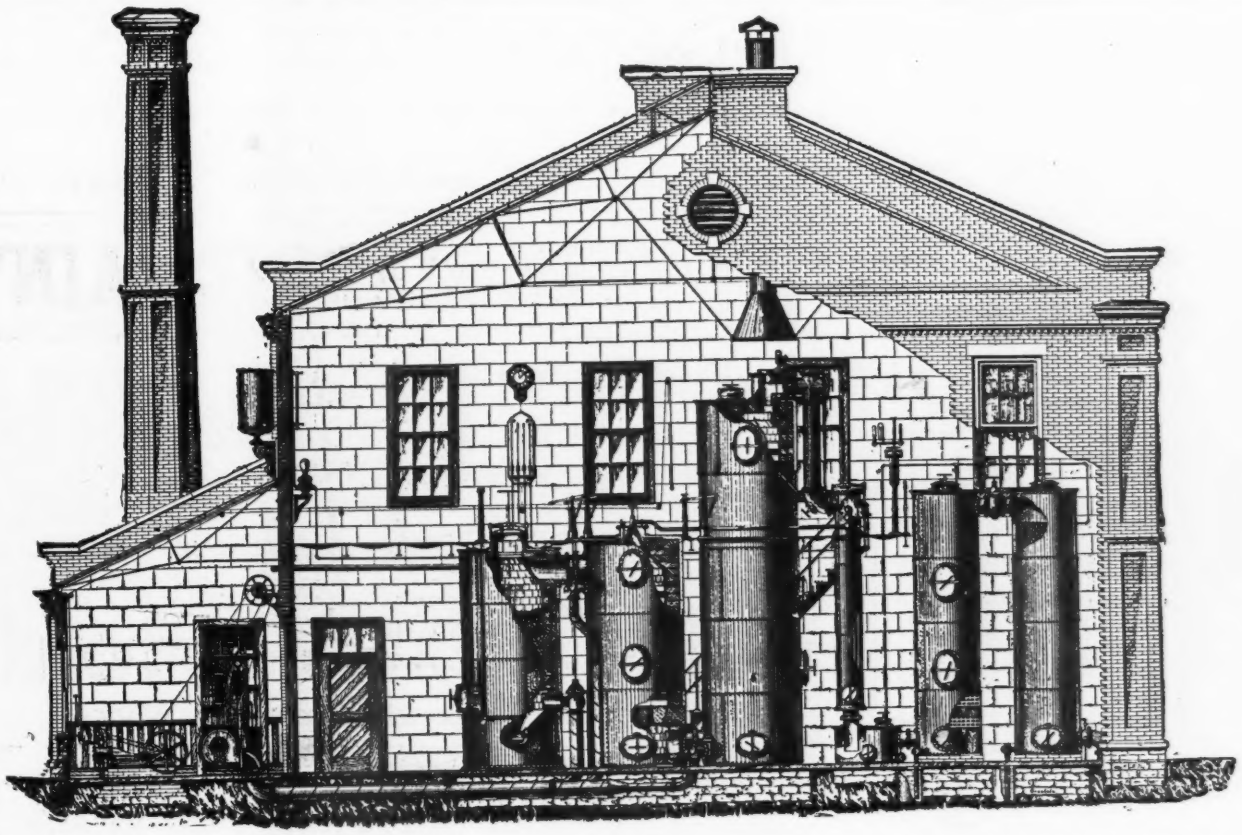

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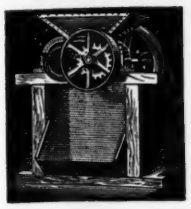

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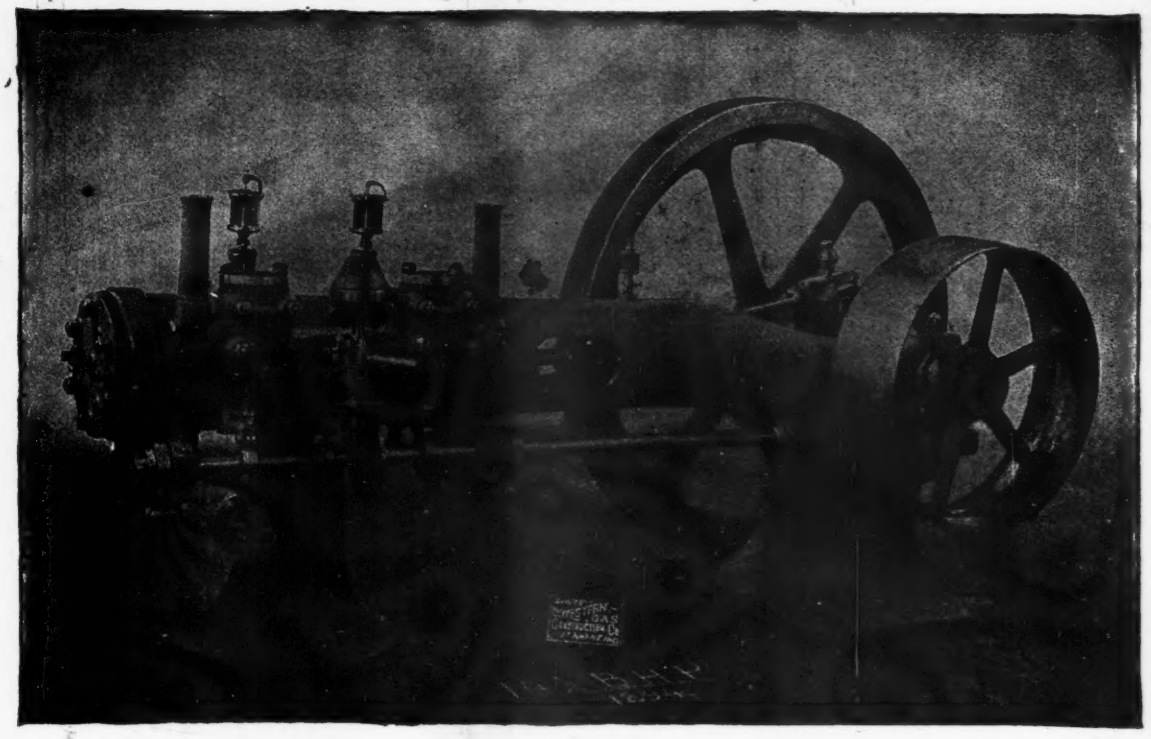

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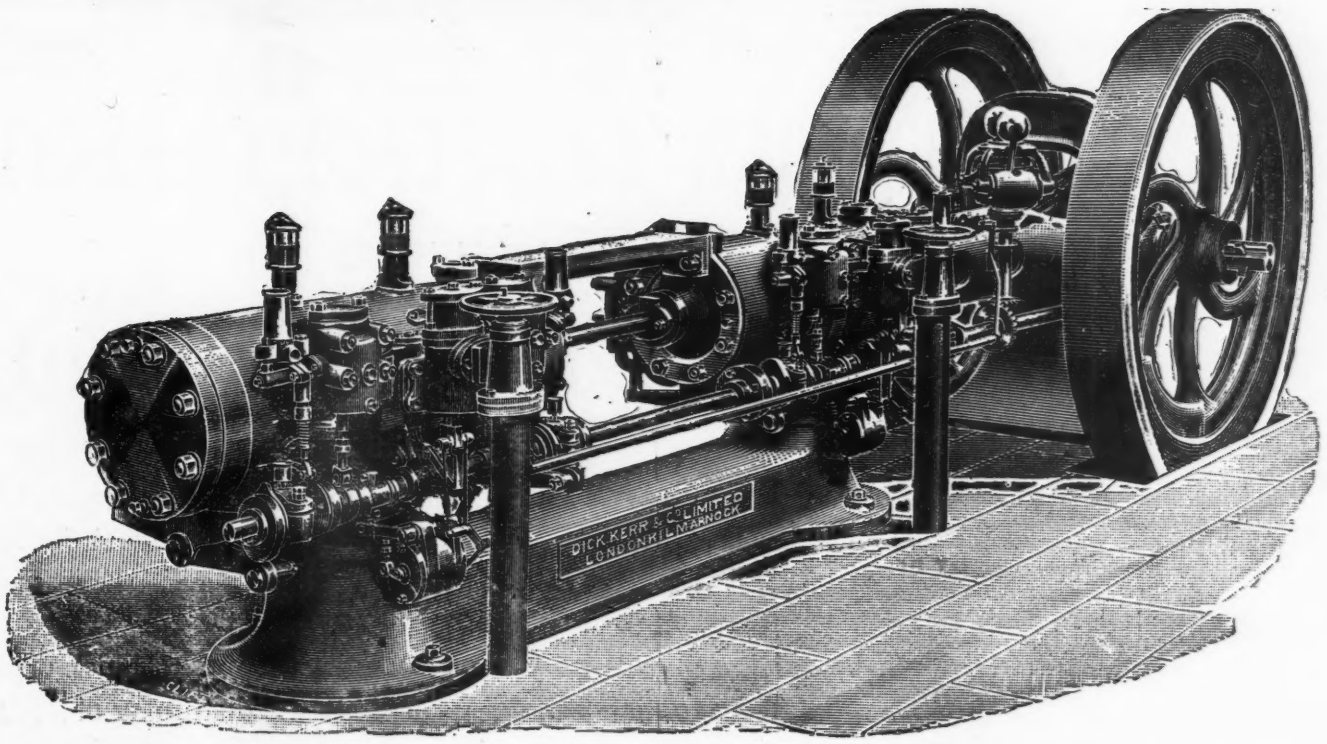

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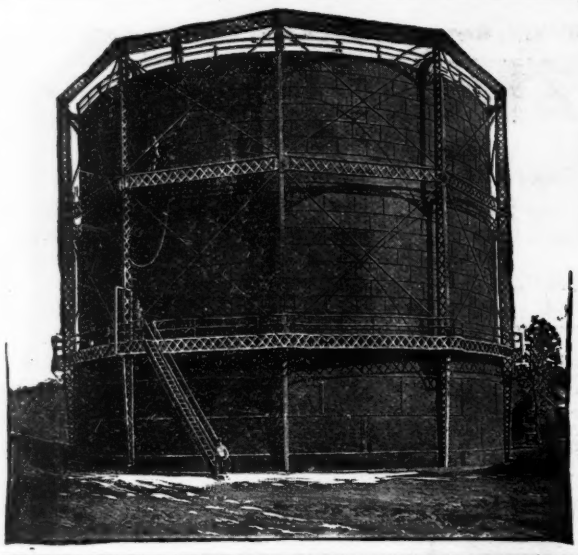

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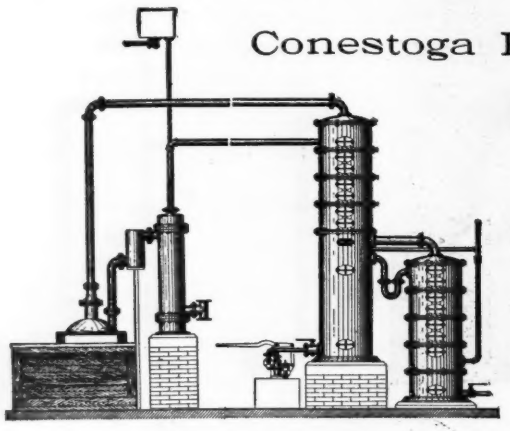

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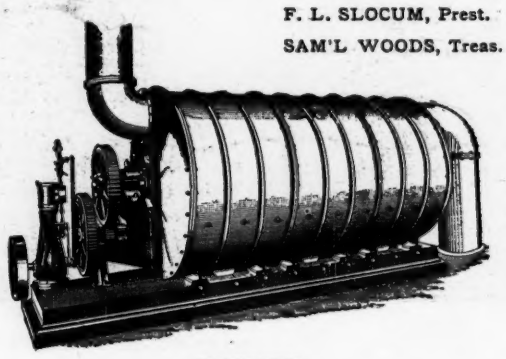

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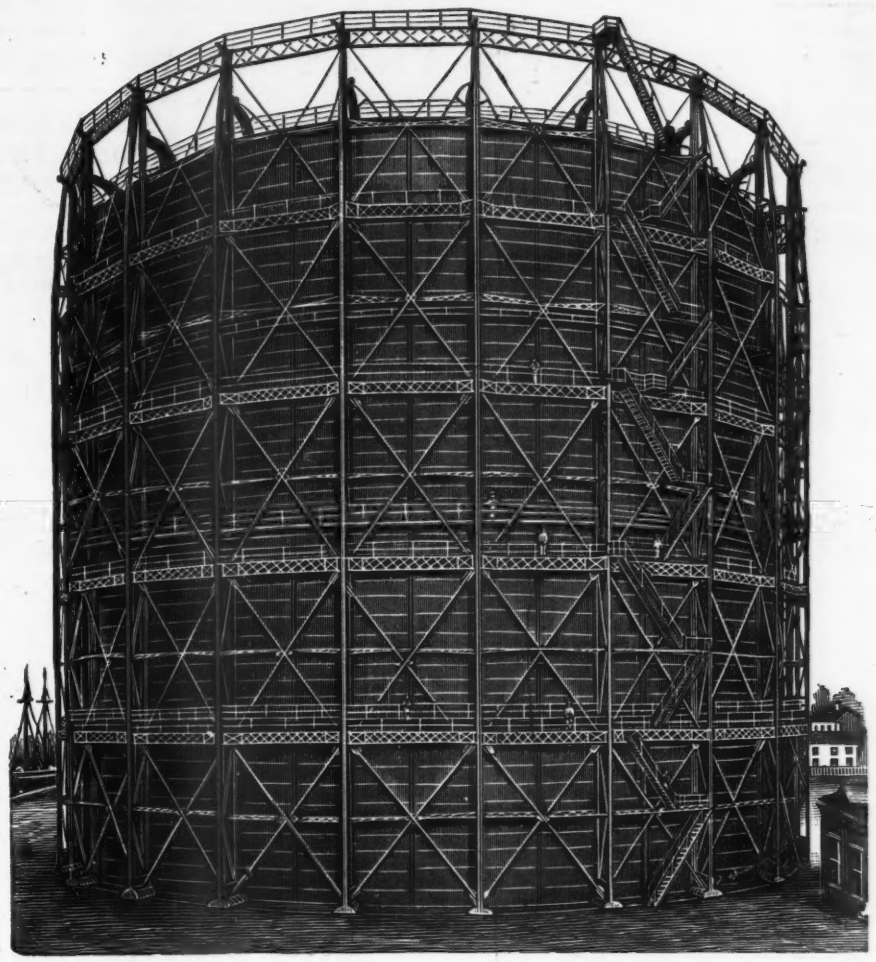

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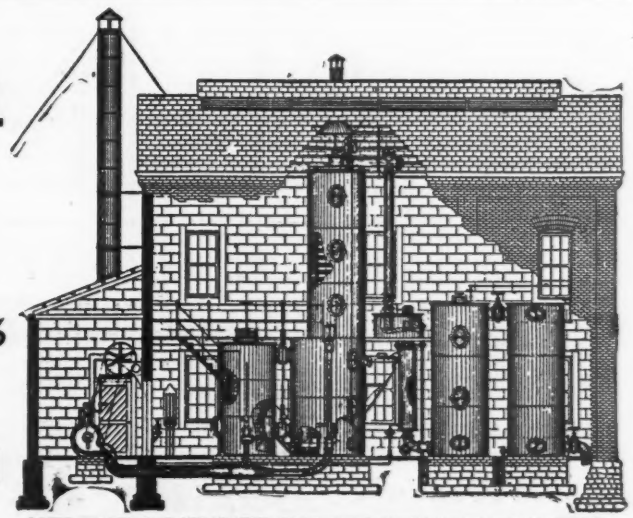

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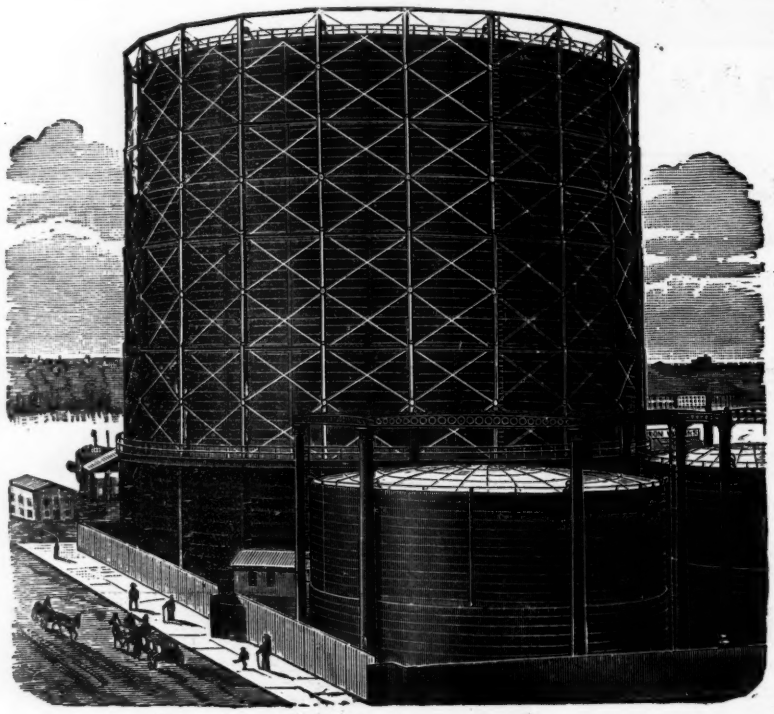

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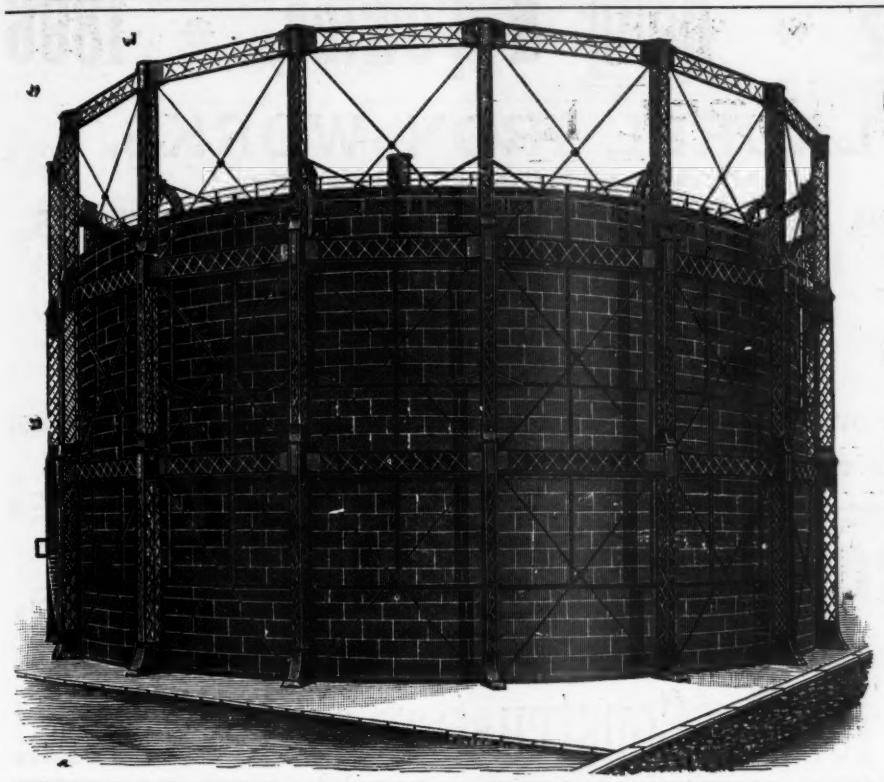

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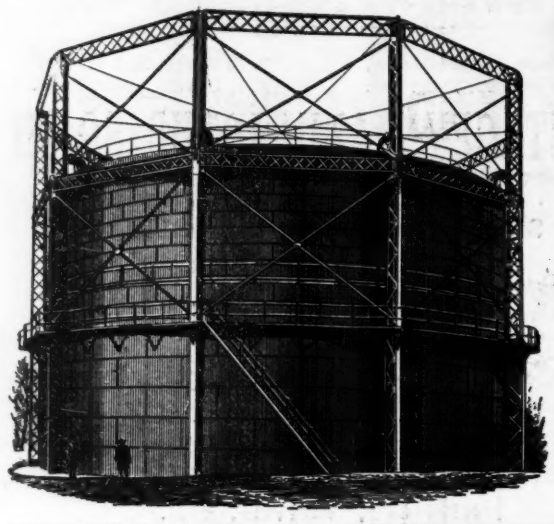

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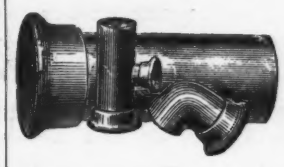

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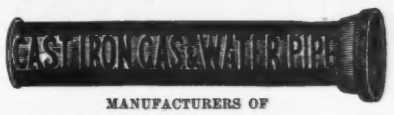

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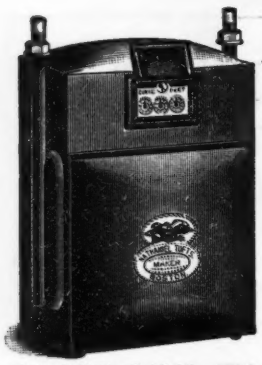

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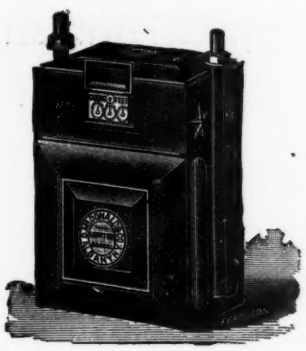

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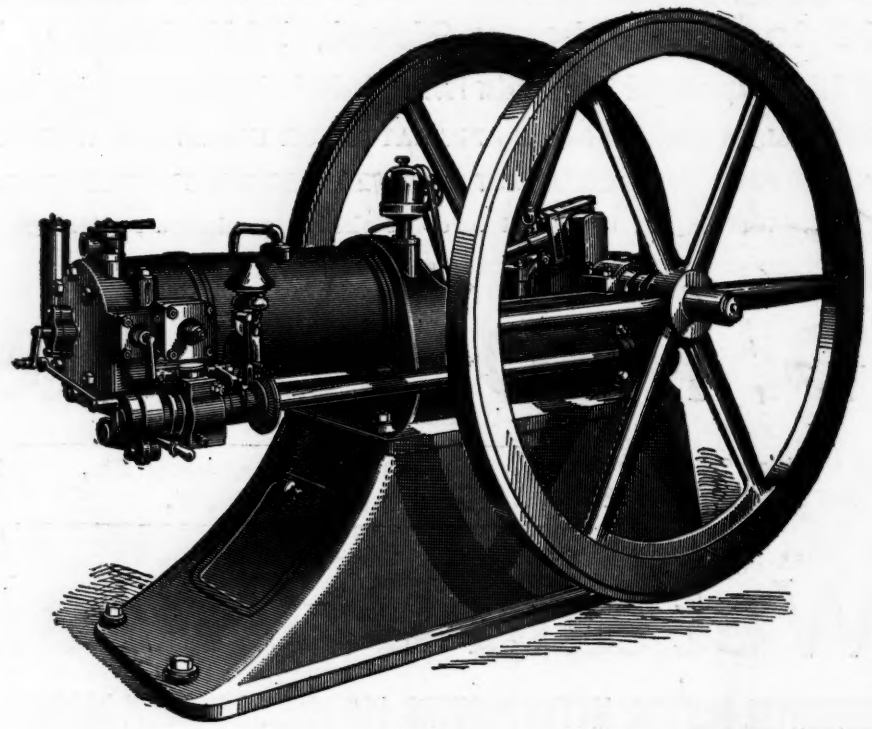

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